

VEGETATION – Use scientific names of plants.

Sampling Point: 54

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: 30' radius)					
1. <u>Populus deltoides</u>	80	<input checked="" type="checkbox"/>	FAC	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80</u> (A/B)	
2. <u>Acer negundo</u>	25	<input checked="" type="checkbox"/>	FACW		
3. _____	_____	<input type="checkbox"/>	_____		
4. _____	_____	<input type="checkbox"/>	_____		
5. _____	_____	<input type="checkbox"/>	_____		
6. _____	_____	<input type="checkbox"/>	_____		
7. _____	_____	<input type="checkbox"/>	_____		
	105	= Total Cover		Prevalence Index worksheet: <div style="display: flex; justify-content: space-between;"> Total % Cover of: Multiply by: </div> OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____	
Sapling/Shrub Stratum (Plot size: 30' radius)					
1. <u>Rhamnus cathartica</u> (100% w/ shallow roots and butt.)	33	<input checked="" type="checkbox"/>	FACU		
2. <u>Ulmus americana</u>	8	<input type="checkbox"/>	FACW		
3. <u>Ribes americanum</u>	3	<input type="checkbox"/>	FACW		
4. _____	_____	<input type="checkbox"/>	_____		
5. _____	_____	<input type="checkbox"/>	_____		
6. _____	_____	<input type="checkbox"/>	_____		
7. _____	_____	<input type="checkbox"/>	_____		
	44	= Total Cover			
Herb Stratum (Plot size: 5' radius)					
1. <u>Phalaris arundinacea</u>	60	<input checked="" type="checkbox"/>	FACW	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is >3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must Be present, unless disturbed or problematic.	
2. <u>Ribes americanum</u>	10	<input type="checkbox"/>	FACW		
3. <u>Solidago gigantea</u>	5	<input type="checkbox"/>	FACW		
4. _____	_____	<input type="checkbox"/>	_____		
5. _____	_____	<input type="checkbox"/>	_____		
6. _____	_____	<input type="checkbox"/>	_____		
7. _____	_____	<input type="checkbox"/>	_____		
8. _____	_____	<input type="checkbox"/>	_____		
9. _____	_____	<input type="checkbox"/>	_____		
10. _____	_____	<input type="checkbox"/>	_____		
11. _____	_____	<input type="checkbox"/>	_____		
12. _____	_____	<input type="checkbox"/>	_____		
	75	= Total Cover			
Woody Vine Stratum (Plot size: 30' radius)					
1. <u>Vitis riparia</u>	6	<input checked="" type="checkbox"/>	FACW	Definitions of Vegetation Strata: Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height	
2. _____	_____	<input type="checkbox"/>	_____		
3. _____	_____	<input type="checkbox"/>	_____		
4. _____	_____	<input type="checkbox"/>	_____		
	6	= Total Cover			
Remarks: (include photo number here or on a separate sheet.) Fresh (wet) meadow and lowland hardwoods. Photo 57.					

SOIL

Sampling Point: 54

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LLR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LLR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Soil profile is similar to No. 53, across the road.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 55

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: SW 1/4 Section 32, T7N, R19E

Landform (hillslope, terrace, etc.): low terrace

Local relief (concave, convex, none): none

Slope (%): 0-2%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Pella silt loam (Ph) Pd

NWI classification: T3/E1K

Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed?

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic?

(If, needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the Sampled Area within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, optional Wetland Site ID: <u>PCA No. 27</u>	
Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>14.5</u>		
Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0 (at surface)</u> (includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Soils saturated at the surface.		

VEGETATION – Use scientific names of plants.

Sampling Point: 55

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	<input type="checkbox"/>	_____	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30' radius)				
1. <u>Salix exigua</u>	<u>50</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>50</u>	= Total Cover		
Herb Stratum (Plot size: 5' radius)				
1. <u>Typha latifolia</u>	<u>90</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
2. <u>Phalaris arundinacea</u>	<u>15</u>	<input type="checkbox"/>	<u>FACW</u>	
3. <u>Aster lateriflorus</u>	<u>1</u>	<input type="checkbox"/>	<u>FACW</u>	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
12. _____	_____	<input type="checkbox"/>	_____	
	<u>106</u>	= Total Cover		
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		

Dominance Test worksheet:
 Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

 Total Number of Dominant Species Across All Strata: 2 (B)

 Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____ x 1 = _____	
FACW species _____ x 2 = _____	
FAC species _____ x 3 = _____	
FACU species _____ x 4 = _____	
UPL species _____ x 5 = _____	
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = _____	

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is >3.0¹
☐ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height

Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (include photo number here or on a separate sheet.) Shallow marsh. Photo 58.

Sampling Point: 55

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining, M=Matrix

Indicators for Problematic Hydric Soils³:

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

- Indicators for Problematic Hydric Soils:
- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
 - ☐ Coast Prairie Redox (A16) (LLR K, L, R)
 - ☐ 5 cm Mucky Peat or Peat (S3) (LLR K, L, R)
 - ☐ Dark Surface (S7) (LRR K, L)
 - ☐ Polyvalue Below Surface (S8) (LRR K, L)
 - ☐ Thin Dark Surface (S9) (LRR K, L)
 - ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
 - ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
 - ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
 - ☐ Red Parent Material (TF2)
 - ☐ Very Shallow Dark Surface (TF12)
 - ☐ Other (Explain in Remarks)

³Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Hydric Soil Present? Yes ☒ No ☐

Depth (inches): 17

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011
 Applicant/Owner: _____ State: WI Sampling Point: 56
 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: SE 1/4 Section 31, T7N, R19E
 Landform (hillslope, terrace, etc.): low terrace Local relief (concave, convex, none): none
 Slope (%): 0-2% Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Pella silt loam (Ph) Pd NWI classification: E2K
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☐
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the Sampled Area within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, optional Wetland Site ID: <u>PCA No. 26</u>
Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u>		<u>Secondary Indicators (minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)		Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION – Use scientific names of plants.

Sampling Point: 56

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Prevalence Index worksheet: <div style="display: flex; justify-content: space-between;"> Total % Cover of: Multiply by: </div> OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5' radius)				
1. <u>Phalaris arundinacea</u>	<u>100</u>	<input checked="" type="checkbox"/>	<u>FACW</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is $\approx 3.0^1$ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Typha X glauca</u>	<u>25</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
12. _____	_____	<input type="checkbox"/>	_____	
	<u>125</u>	= Total Cover		
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Definitions of Vegetation Strata: Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: (include photo number here or on a separate sheet.) Fresh (wet) meadow. Photo 59.				

SOIL

Sampling Point: 56

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histic Sol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (LRR K, L, **MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (LLR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LLR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L) :
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

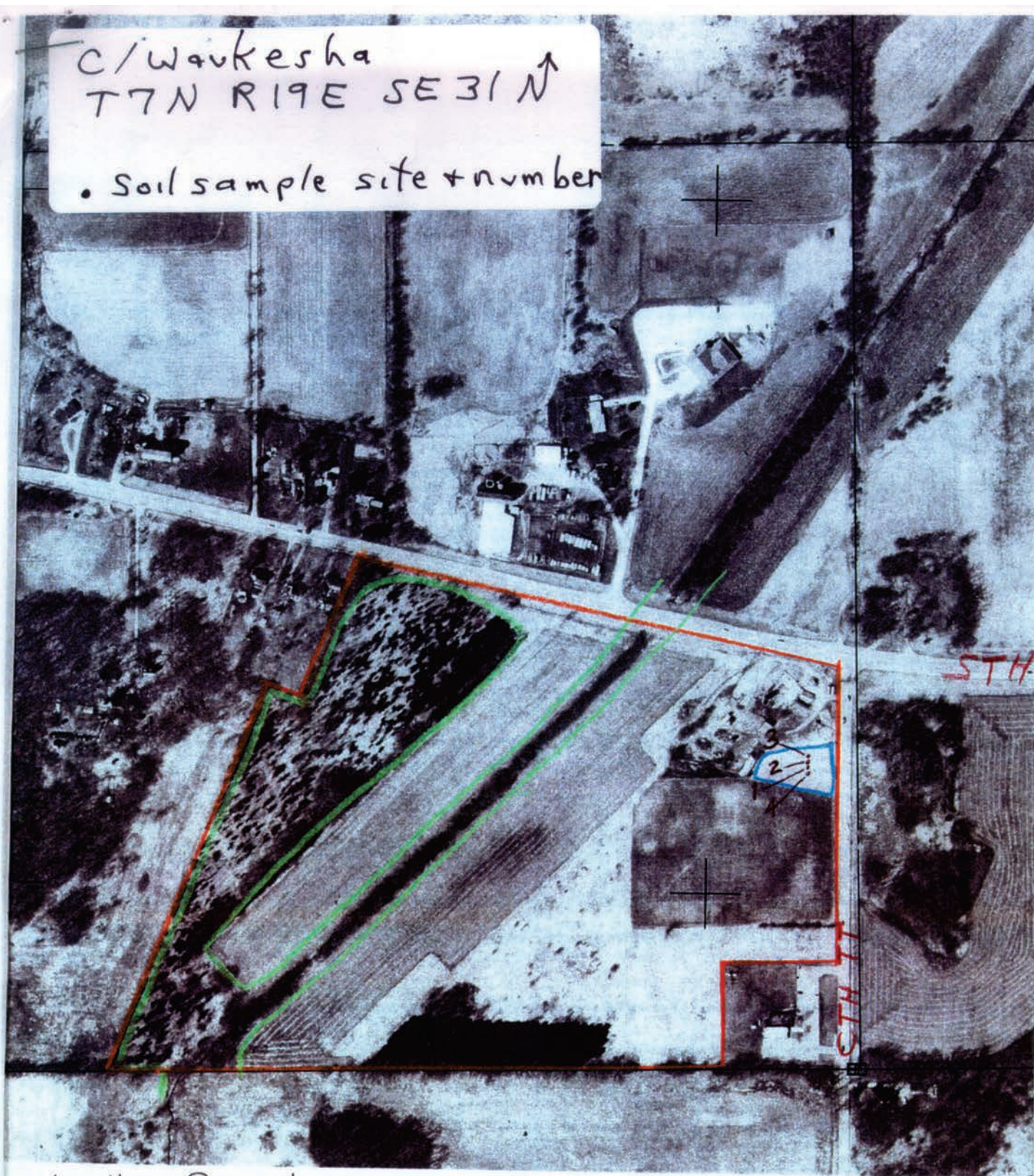
Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: See attached data sheets for soils data taken from Van Horn property field delineation on September 28, 1999.

C/Waukesha
T7N R19E SE31N ↑

• Soil sample site + number



Van Horn Property

2,458,000 E

1995

ORTHOPHOTOGRAPH

SEWRPC FIELD DATA FORM
ROUTINE WETLAND DETERMINATION

PROJECT NAME: Van Horn Property FILE NO.: _____
 LOCATION: City of Waukesha Waukesha COUNTY SE ¼ SECTION 31 T. 7 N. R. 19 E
 DATE: September 28, 1999
 OBSERVERS: D.M. Reed, K.I. Griswold, C.J. Jors, SEWRPC and Greg Breese, DNR
 PLANT COMMUNITY AREA NO.: — TRANSECT NO.: 1 SAMPLE SITE NO.: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other <u>NON-Dominant</u> Plant Species	Stratum	Indicator
1. <u>Phalaris arundinacea</u>	<u>H</u>	<u>FAW+</u>			
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Percent of Dominant Species that are OBL, FACS, or FAC (Excluding FAC-) 100%

Remarks:
Disturbed Fresh (wet) meadow.

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Root Zone <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <input type="checkbox"/> Floodways Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Root Zone <input type="checkbox"/> Water-Stained Leaves <input checked="" type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface water: <u>—</u> (in.) Depth of Soil Pit: <u>22</u> (in.) Depth to Free Water in Pit: <u>—</u> (in.) Depth to Saturated Soil <u>at surface 0</u> (in.)	
Remarks <u>NRCS wetland map shows area as "PC" (Prior Converted)</u>	

SOILS

[illegible]

SITE CONDITIONS

Do normal environmental conditions exist at the plant community?
Yes _____ No ☒ (If no, explain)

Is the site a problem area?
Yes _____ No ☒ (if yes, explain)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ☒ No _____ (If yes, explain)

Remarks: Marsh may recently cut. Site has a history of plowing.

WETLAND DETERMINATION

Based on the foregoing, area:		This sampling point is within a wetland	
Hydrophytic Plants Dominant?	Yes No (Circle)	(Circle)	Yes No
Wetland Hydrology Present?	Yes No		
Wetland Soils Present?	Yes No		
Remarks: All wetland indicator requirements are present.			

SEWRPC FIELD DATA FORM
ROUTINE WETLAND DETERMINATION

PROJECT NAME: Van Horn Property FILE NO.: _____
 LOCATION: City of Waukesha, Waukesha COUNTY SE ¼ SECTION 31, T. 7 N, R. 19 E
 DATE: September 28, 1999
 OBSERVERS: D.M. Reed, K.I. Griswold, C.J. Oers, SEWRPC and Greg Breese, DNR
 PLANT COMMUNITY AREA NO.: - TRANSECT NO.: 1 SAMPLE SITE NO.: 2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other <u>NON-Dominant</u> Plant Species	Stratum	Indicator
1. <u>Phalaris arundinacea</u>	<u>H</u>	<u>FACW+</u>			
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Percent of Dominant Species that are OBL, FACS, or FAC (Excluding FAC-) 100%

Remarks: Disturbed Fresh (wet) meadow.

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Root Zone <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <input type="checkbox"/> Floodways <p>Secondary Indicators (2 or more required):</p> <input type="checkbox"/> Oxidized Root Channels in Root Zone <input type="checkbox"/> Water-Stained Leaves <input checked="" type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
<p>Field Observations:</p> <p>Depth of Surface water: <u>-</u> (in.)</p> <p>Depth of Soil Pit: <u>23</u> (in.)</p> <p>Depth to Free Water in Pit: <u>-</u> (in.)</p> <p>Depth to Saturated Soil <u>(at surface) 0</u> (in.)</p>	
<p>Remarks <u>NRCS wetland map shows area as "PC" (Prior Converted)</u></p>	

SOILS

Map Unit Name
(Series and Phase): Pella silt loam

Drainage Class: Poorly drained
Field Observations
Confirm Mapped Type? Yes No X

Taxonomy (Subgroup) Typic Haplaquolls

Profile Description:

Depth (Inches)	Horizon	Matrix color (Munsell Moist)	Redox concentration color (Munsell Moist)	Redox concentrations (Abundance/Contrast)	Texture Concretions, Structure, etc
0-12"		N10			Silty clay loam
12-23"		2.5Y 4/1	10YR 6/6	Common/prominent	clay

Wetland Soil Indicators:

<input type="checkbox"/> Histosol	<input checked="" type="checkbox"/> Bright Mottling within a Depleted Matrix
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> Concretions
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Gleyed	<input type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

USDA Hydric Soils Field Indicator: F5. Thick Dark Surface

NRCS Mapped Type: PC

Remarks:
 Current soils indicator is A.12 Thick Dark Surface

SITE CONDITIONS

Do normal environmental conditions exist at the plant community?
Yes _____ No ☒ (If no, explain)

Is the site a problem area?
Yes _____ No ☒ (if yes, explain)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ☒ No _____ (If yes, explain)

Remarks: Marsh hay recently cut. Site has history of plowing.

WETLAND DETERMINATION

Based on the foregoing, area:		(Circle) Yes	No
Hydrophytic Plants Dominant?	Yes	No	(Circle)
Wetland Hydrology Present?	Yes	No	
Wetland Soils Present?	Yes	No	
Remarks: All wetland indicator requirements are present.			

SEWRPC FIELD DATA FORM
ROUTINE WETLAND DETERMINATION

PROJECT NAME: Van Horn Property FILE NO.: _____
 LOCATION: City of Waukesha Waukesha COUNTY SE ¼ SECTION 31, T. 7 N, R. 19 E
 DATE: September 28, 1999
 OBSERVERS: D.M. Reed, KT Griswold, CJ Jors, SEWRPC and Greg Breese, DNR
 PLANT COMMUNITY AREA NO.: - TRANSECT NO.: 1 SAMPLE SITE NO.: 3

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other <u>NON-Dominant</u> Plant Species	Stratum	Indicator
1. <u>Poa pratensis</u>	<u>H</u>	<u>FAC-</u>			
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Percent of Dominant Species that are OBL, FACS, or FAC (Excluding FAC-) 0%

Remarks: Agricultural field.

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Root Zone <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <input type="checkbox"/> Floodways Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Root Zone <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface water: <u>—</u> (in.) Depth of Soil Pit: <u>14</u> (in.) Depth to Free Water in Pit: <u>—</u> (in.) Depth to Saturated Soil: <u>—</u> (in.)	
Remarks: <u>No wetland hydrology indicators observed. Soil is dry. Refusal at 14" due to bedrock.</u>	

SOILS

[illegible]

SITE CONDITIONS

Do normal environmental conditions exist at the plant community?
Yes _____ No ☒ (If no, explain)

Is the site a problem area?
Yes _____ No ☒ (if yes, explain)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ☒ No _____ (If yes, explain)

Remarks: Site has a history of plowing.

WETLAND DETERMINATION

Based on the foregoing, area: Hydrophytic Plants Dominant? Yes <u>No</u> (Circle) Wetland Hydrology Present? Yes <u>No</u> Wetland Soils Present? <u>Yes</u> No	This sampling point is within a wetland (Circle) Yes <u>No</u>
Remarks: Only one wetland indicator is present. Refusal at 14" due to bedrock.	

SEWRPC FIELD DATA FORM
ROUTINE WETLAND DETERMINATION

PROJECT NAME: Van Horn Property FILE NO.: _____
 LOCATION: City of Waukesha, Waukesha COUNTY SE ¼ SECTION 31, T. 7N, R. 19 E
 DATE: September 28, 1991
 OBSERVERS: DM Reed, K Griswold, CDors, SEWRPC and Greg Breese, DNR
 PLANT COMMUNITY AREA NO.: _____ TRANSECT NO.: 1 SAMPLE SITE NO.: 4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other <u>NON-Dominant</u> Plant Species	Stratum	Indicator
1. <u>Poa pratensis</u>	<u>H</u>	<u>FAC-</u>	<u>Phalaris arundinacea</u>	<u>H</u>	<u>FACw+</u>
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Percent of Dominant Species that are OBL, FACS, or FAC (Excluding FAC-) 0%

Remarks: Agricultural field

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Root Zone <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <input type="checkbox"/> Floodways <p>Secondary Indicators (2 or more required):</p> <input type="checkbox"/> Oxidized Root Channels in Root Zone <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
<p>Field Observations:</p> <p>Depth of Surface water: _____ (in.)</p> <p>Depth of Soil Pit: <u>24</u> (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: _____ (in.)</p>	
<p>Remarks: <u>Soil is moist, but not saturated at 0-8". Soil is dry at 8-18".</u> <u>No wetland hydrology indicators are present.</u></p>	

SOILS

Map Unit Name (Series and Phase): <u>Pella silt loam</u>		Drainage Class: <u>Poorly drained</u> Field Observations Confirm Mapped Type? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			
Taxonomy (Subgroup) <u>Typic Haplaquolls</u>					
Profile Description:					
Depth (Inches)	Horizon	Matrix color (Munsell Moist)	Redox concentration color (Munsell Moist)	Redox concentrations (Abundance/Contrast)	Texture Concretions, Structure, etc
0-8"		N1/0			silt loam (moist)
8-18"		N1/0			silt loam (dry)
18-24"		2.5Y 4/1	10YR 6/6	common / prominent	clay
Wetland Soil Indicators:					
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed <input checked="" type="checkbox"/> Low-Chroma Colors </div> <div style="width: 45%;"> <input checked="" type="checkbox"/> Bright Mottling within a Depleted Matrix <input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks) </div> </div>					
USDA Hydric Soils Field Indicator: <u>F5. Thick Dark Surface</u>					
NRCS Mapped Type: <u>PC</u>					
Remarks:					
<u>Current soils indicator is A.12 Thick Dark Surface</u>					

SITE CONDITIONS

Do normal environmental conditions exist at the plant community?
Yes _____ No 1 (If no, explain)

Is the site a problem area?
Yes _____ No 1 (if yes, explain)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes 1 No _____ (If yes, explain)

Remarks: Site has a history of plowing

WETLAND DETERMINATION

Based on the foregoing, area:		This sampling point is within a wetland	
Hydrophytic Plants Dominant?	Yes Yes Yes	No No No	(Circle) Yes No
Remarks: Only one wetland indicator requirement is present.			

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 57

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: SE 1/4 Section 31, T7N, R19E

Landform (hillslope, terrace, etc.): low terrace

Local relief (concave, convex, none): concave

Slope (%): 12-30%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Ritchey silt loam (RkE)

NWI classification: none

Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed?

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic?

(If, needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soils Present? ☐ Yes ☒ No
Wetland Hydrology Present? ☒ Yes ☐ No

Is the Sampled Area within a Wetland? ☒ Yes ☐ No

If yes, optional Wetland Site ID: PCA No. 28

Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Secondary Indicators (minimum of two required)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Water-Stained Leaves (B9) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Marl Deposits (B15) |
| <input type="checkbox"/> Water marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input checked="" type="checkbox"/> Algal Mat or Crust (B4) PHOTOS 60, 61 | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Moss Trim Lines (B16) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Shallow Aquitard (D3) |
| <input type="checkbox"/> Microtopographic Relief (D4) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____
Water Table Present? Yes ☐ No ☒ Depth (inches): _____
Saturation Present? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site is a constructed drainage ditch. Photos 60 and 61.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		Prevalence Index worksheet: <div style="display: flex; justify-content: space-between;"> <u>Total % Cover of:</u> <u>Multiply by:</u> </div> OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5' radius)				
1. <u>Typha angustifolia</u>	<u>67</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
2. <u>Poa pratensis</u>	<u>15</u>	<input type="checkbox"/>	<u>FAC</u>	
3. <u>Epilobium coloratum</u>	<u>5</u>	<input type="checkbox"/>	<u>OBL</u>	
4. <u>Polygonum persicaria</u>	<u>5</u>	<input type="checkbox"/>	<u>FACW</u>	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
12. _____	_____	<input type="checkbox"/>	_____	
	<u>92</u>	= Total Cover		
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Remarks: (include photo number here or on a separate sheet.) Shallow marsh. Photo 62.				

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is =3.0¹
☐ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height

Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height

Hydrophytic Vegetation Present? Yes ☒ No ☐

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LLR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LLR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 1"

Hydric Soil Present?

Yes ☐

No ☒

Remarks: 1" of muck in the surface layer. Refusal due to gravel.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 58

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: SE 1/4 Section 31, T7N, R19E

Landform (hillslope, terrace, etc.): terrace

Local relief (concave, convex, none): none

Slope (%): 6-12%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Hochheim loam (HmC2) Wd

NWI classification: none

Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation X, Soil X, or Hydrology _____ significantly disturbed?

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic?

(If, needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the Sampled Area within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If yes, optional Wetland Site ID: _____	
Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Disturbed vegetation due to regular mowing. Disturbed soils due to past filling for site development.	

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
(includes capillary fringe)		Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: No hydrology indicators observed.		

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Prevalence Index worksheet: <div style="display: flex; justify-content: space-between;"> Total % Cover of: Multiply by: </div> OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5' radius)				
1. <u>Poa pratensis</u>	<u>60</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is =3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Parthenocissus quinquefolia</u>	<u>20</u>	<input type="checkbox"/>	<u>FACU</u>	
3. <u>Daucus carota</u>	<u>12</u>	<input type="checkbox"/>	<u>NI</u>	
4. <u>Setaria glauca</u>	<u>10</u>	<input type="checkbox"/>	<u>FAC</u>	
5. <u>Cirsium arvense</u>	<u>5</u>	<input type="checkbox"/>	<u>FACU</u>	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
12. _____	_____	<input type="checkbox"/>	_____	
	<u>107</u>	= Total Cover		
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Definitions of Vegetation Strata: Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: (include photo number here or on a separate sheet.) Mowed lawn. Photo 63.				

Sampling Point: 58

Northcentral and Northeast Region – Interim Version

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 59

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: SE 1/4 Section 31, T7N, R19E

Landform (hillslope, terrace, etc.): drainageway

Local relief (concave, convex, none): concave

Slope (%): 0-2%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Pella silt loam, moderately shallow variant (Pm) Pd

NWI classification: T3K

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Yes ☒ No ☐

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If, needed, explain any answers in Remarks.)

(If, needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soils Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No

Is the Sampled Area within a Wetland? ☒ Yes ☐ No

If yes, optional Wetland Site ID: PCA No. 29

Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Secondary Indicators (minimum of two required)

- | | |
|--|---|
| <input type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Water-Stained Leaves (B9) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Fauna (B13) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Marl Deposits (B15) |
| <input type="checkbox"/> Water marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |

- | |
|--|
| <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Moss Trim Lines (B16) |
| <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Stunted or Stressed Plants (D1) |
| <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Shallow Aquitard (D3) |
| <input type="checkbox"/> Microtopographic Relief (D4) |
| <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____
Water Table Present? Yes ☐ No ☒ Depth (inches): _____
Saturation Present? Yes ☒ No ☐ Depth (inches): 13
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Acer negundo</u>	50	<input checked="" type="checkbox"/>	FACW	
2. <u>Fraxinus pennsylvanica</u>	20	<input checked="" type="checkbox"/>	FACW	
3. <u>Prunus serotina</u>	20	<input checked="" type="checkbox"/>	FACU	
4. <u>Acer saccharinum</u>	15	<input type="checkbox"/>	FACW	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	105	= Total Cover		
<u>Sapling/Shrub Stratum (Plot size: 30' radius)</u>				
1. <u>Viburnum opulus</u>	15	<input checked="" type="checkbox"/>	NI	
2. <u>Rhamnus frangula</u>	8	<input checked="" type="checkbox"/>	FAC	
3. <u>Lonicera x bella</u>	5	<input type="checkbox"/>	NI	
4. <u>Rhamnus cathartica</u>	5	<input type="checkbox"/>	FACU	
5. <u>Rosa palustris</u>	2	<input type="checkbox"/>	OBL	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	35	= Total Cover		
<u>Herb Stratum (Plot size: 5' radius)</u>				
1. <u>Phalaris arundinacea</u>	50	<input checked="" type="checkbox"/>	FACW	
2. <u>Ribes americanum</u>	25	<input checked="" type="checkbox"/>	FACW	
3. <u>Ambrosia trifida</u>	5	<input type="checkbox"/>	FAC	
4. <u>Geum canadense</u>	5	<input type="checkbox"/>	FAC	
5. <u>Solidago gigantea</u>	5	<input type="checkbox"/>	FACW	
6. <u>Echinocystis lobata</u>	3	<input type="checkbox"/>	FACW	
7. <u>Helianthus tuberosa</u>	2	<input type="checkbox"/>	NI	
8. <u>Thalictrum dasycarpum</u>	1	<input type="checkbox"/>	FACW	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
12. _____	_____	<input type="checkbox"/>	_____	
	96	= Total Cover		
<u>Woody Vine Stratum (Plot size: 30' radius)</u>				
1. <u>Vitis riparia</u>	10	<input checked="" type="checkbox"/>	FACW	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
	10	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____ x 1 = _____	
FACW species _____ x 2 = _____	
FAC species _____ x 3 = _____	
FACU species _____ x 4 = _____	
UPL species _____ x 5 = _____	
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = _____	

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is >3.0¹

☐ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height

Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (include photo number here or on a separate sheet.) Fresh (wet) meadow and lowland hardwoods. Photo.64.

Sampling Point: 59

[illegible]²Location: PL=Pore Lining, M=Matrix

Indicators for Problematic Hydric Soils³:

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

- Indicators for Problematic Hydric Soils:
- ☐ 2 cm Muck (A10) (LRR K, L, **MLRA 149B**)
 - ☐ Coast Prairie Redox (A16) (LLR K, L, R)
 - ☐ 5 cm Mucky Peat or Peat (S3) (LLR K, L, R)
 - ☐ Dark Surface (S7) (LRR K, L)
 - ☐ Polyvalue Below Surface (S8) (LRR K, L)
 - ☐ Thin Dark Surface (S9) (LRR K, L)
 - ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
 - ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
 - ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
 - ☐ Red Parent Material (TF2)
 - ☐ Very Shallow Dark Surface (TF12)
 - ☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Hydric Soil Present? Yes ☒ No ☐

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 60

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: NE 1/4 Section 31, T7N, R19E

Landform (hillslope, terrace, etc.): stormwater pond

Local relief (concave, convex, none): concave

Slope (%): 1-3%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Pistakee silt loam (PrA) Spd

NWI classification: T3K

Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation____, Soil____, or Hydrology____ significantly disturbed?

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation____, Soil____, or Hydrology____ naturally problematic?

(If, needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the Sampled Area within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, optional Wetland Site ID: <u>PCA No. 30</u>	
Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Constructed stormwater detention pond.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>7</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Water Table Present? Yes <input type="checkbox"/> No <input type="checkbox"/> Depth (inches): _____		
Saturation Present? Yes <input type="checkbox"/> No <input type="checkbox"/> Depth (inches): _____ (includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30' radius)				
1. <u>Salix nigra</u>	<u>5</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	Prevalence Index worksheet: <div style="display: flex; justify-content: space-between;"> Total % Cover of: Multiply by: </div> OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. <u>Salix petiolaris</u>	<u>5</u>	<input checked="" type="checkbox"/>	<u>FACW</u>	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>10</u>	= Total Cover		
Herb Stratum (Plot size: 5' radius)				
1. <u>Scirpus validus</u>	<u>33</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is =3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Alisma plantago-aquatica</u>	<u>5</u>	<input type="checkbox"/>	<u>OBL</u>	
3. <u>Echinochloa crusgalli</u>	<u>2</u>	<input type="checkbox"/>	<u>FACW</u>	
4. <u>Typha angustifolia</u>	<u>1</u>	<input type="checkbox"/>	<u>OBL</u>	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
12. _____	_____	<input type="checkbox"/>	_____	
	<u>41*</u>	= Total Cover		
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Definitions of Vegetation Strata: Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: (include photo number here or on a separate sheet.) * Chara (moss) sp. covers 33% of sample area substrate. Stormwater detention pond with shallow marsh along the edge. Photo 65.				

Sampling Point: 60

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains²Location: PL=Pore Lining, M=Matrix

Indicators for Problematic Hydric Soils³:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LLR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LLR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☒ Other (Explain in Remarks)

³Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Soils inundated with 7" of water, hydric by definition - Criteria 3.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 61

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: NE 1/4 Section 31, T7N, R19E

Landform (hillslope, terrace, etc.): terrace

Local relief (concave, convex, none): none

Slope (%): 2-6%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Theresa silt loam (ThB) Wd

NWI classification: none

Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed?

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic?

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☐ Yes ☒ No
Hydric Soils Present? ☐ Yes ☒ No
Wetland Hydrology Present? ☐ Yes ☒ No

Is the Sampled Area within a Wetland? ☐ Yes ☒ No

If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Moss Trim Lines (B16)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ Microtopographic Relief (D4)
☐ FAC-Neutral Test (D5)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)

☐ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ Marl Deposits (B15)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres on Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____
Water Table Present? Yes ☐ No ☒ Depth (inches): _____
Saturation Present? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No hydrology indicators observed.

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: 30' radius)					
1. <u>Juglans nigra</u>	33	<input checked="" type="checkbox"/>	NI	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>43</u> (A/B)	
2. <u>Pinus resinosa</u> (planted)	25	<input checked="" type="checkbox"/>	FACU		
3. <u>Acer negundo</u>	10	<input type="checkbox"/>	FACW		
4. _____	_____	<input type="checkbox"/>	_____		
5. _____	_____	<input type="checkbox"/>	_____		
6. _____	_____	<input type="checkbox"/>	_____		
7. _____	_____	<input type="checkbox"/>	_____		
	68	= Total Cover		Prevalence Index worksheet: <div style="display: flex; justify-content: space-between;"> Total % Cover of: Multiply by: </div> OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____	
Sapling/Shrub Stratum (Plot size: 30' radius)					
1. <u>Rhamnus cathartica</u>	50	<input checked="" type="checkbox"/>	FACU		
2. <u>Acer negundo</u>	10	<input type="checkbox"/>	FACW		
3. <u>Morus alba</u>	2	<input type="checkbox"/>	FAC		
4. _____	_____	<input type="checkbox"/>	_____		
5. _____	_____	<input type="checkbox"/>	_____		
6. _____	_____	<input type="checkbox"/>	_____		
7. _____	_____	<input type="checkbox"/>	_____		
	62	= Total Cover		Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is =3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Herb Stratum (Plot size: 5' radius)					
1. <u>Parthenocissus quinquefolia</u>	25	<input checked="" type="checkbox"/>	FACU		
2. <u>Alliaria officinalis</u>	15	<input checked="" type="checkbox"/>	FAC		
3. <u>Geum canadense</u>	15	<input checked="" type="checkbox"/>	FAC		
4. <u>Smilacina racemosa</u>	6	<input type="checkbox"/>	FACU		
5. <u>Ambrosia trifida</u>	5	<input type="checkbox"/>	FAC		
6. <u>Rhus radicans</u>	5	<input type="checkbox"/>	FAC		
7. <u>Circeae lutetiana</u>	3	<input type="checkbox"/>	FACU	Definitions of Vegetation Strata: Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height	
8. <u>Ribes cynosbati</u>	3	<input type="checkbox"/>	NI		
9. <u>Rubus occidentalis</u>	3	<input type="checkbox"/>	NI		
10. <u>Vitis riparia</u>	3	<input type="checkbox"/>	FACW		
11. <u>Agrimonia gryposepala</u>	2	<input type="checkbox"/>	FACU		
12. <u>Fraxinus pennsylvanica</u>	2	<input type="checkbox"/>	FACW		
	89*	= Total Cover			
Woody Vine Stratum (Plot size: 30' radius)					
1. <u>Vitis riparia</u>	15	<input checked="" type="checkbox"/>	FACW	Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
2. <u>Parthenocissus quinquefolia</u>	3	<input type="checkbox"/>	FACU		
3. _____	_____	<input type="checkbox"/>	_____		
4. _____	_____	<input type="checkbox"/>	_____		
	18	= Total Cover			
Remarks: (include photo number here or on a separate sheet.) * Other NON-dominant herbs include: Arisaema triphyllum (1%) FACW and Aster lateriflorus (1%) FACW. Upland hardwoods and buckthorn thicket. Photo 66.					

Sampling Point: 61

[illegible]²Location: PL=Pore Lining, M=Matrix

Indicators for Problematic Hydric Soils³:

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LLR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LLR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

Hydric Soil Present? Yes ☐ No ☒

Remarks: Refusal at 12" using sharp-shooter and soil probe due to ultra dry conditions. Upland soils present.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 62

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: NE 1/4 Section 31, T7N, R19E

Landform (hillslope, terrace, etc.): low terrace

Local relief (concave, convex, none): none

Slope (%): 2-6%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Knowels silt loam (KwB) Wd

NWI classification: T3K

Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed?

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology ☒ naturally problematic?

(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the Sampled Area within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, optional Wetland Site ID: <u>PCA No.31</u>	
Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Potential seasonal groundwater discharged area that has been altered by past ditching.	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (includes capillary fringe)	Depth (inches): _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Seasonal hydrology.		

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' radius)			
1. <u>Acer negundo</u>	50	<input checked="" type="checkbox"/>	FACW
2. <u>Ulmus americana</u>	25	<input checked="" type="checkbox"/>	FACW
3. <u>Fraxinus pennsylvanica</u>	10	<input type="checkbox"/>	FACW
4. <u>Juglans nigra</u>	10	<input type="checkbox"/>	NI
5. <u>Thuja occidentalis</u>	10	<input type="checkbox"/>	FACW
6. <u>Prunus serotina</u>	5	<input type="checkbox"/>	FACU
7. _____	_____	<input type="checkbox"/>	_____
	110	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. <u>Acer negundo</u>	25	<input checked="" type="checkbox"/>	FACW
2. <u>Prunus serotina</u>	6	<input type="checkbox"/>	FACU
3. <u>Crataegus sp.</u>	5	<input type="checkbox"/>	NI
4. <u>Rhamnus cathartica</u>	3	<input type="checkbox"/>	FACU
5. <u>Fraxinus pennsylvanica</u>	2	<input type="checkbox"/>	FACW
6. <u>Lonicera x bella</u>	2	<input type="checkbox"/>	NI
7. <u>Rubus occidentalis</u>	2	<input type="checkbox"/>	NI
	45	= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. <u>Impatiens capensis</u>	50	<input checked="" type="checkbox"/>	FACW
2. <u>Phalaris arundinacea</u>	40	<input checked="" type="checkbox"/>	FACW
3. <u>Ribes americanum</u>	5	<input type="checkbox"/>	FACW
4. <u>Alliaria officinalis</u>	2	<input type="checkbox"/>	FAC
5. <u>Geum canadense</u>	2	<input type="checkbox"/>	FAC
6. <u>Rubus occidentalis</u>	2	<input type="checkbox"/>	NI
7. _____	_____	<input type="checkbox"/>	_____
8. _____	_____	<input type="checkbox"/>	_____
9. _____	_____	<input type="checkbox"/>	_____
10. _____	_____	<input type="checkbox"/>	_____
11. _____	_____	<input type="checkbox"/>	_____
12. _____	_____	<input type="checkbox"/>	_____
	101	= Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1. _____	_____	<input type="checkbox"/>	_____
2. _____	_____	<input type="checkbox"/>	_____
3. _____	_____	<input type="checkbox"/>	_____
4. _____	_____	<input type="checkbox"/>	_____
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____ x 1 = _____	
FACW species _____ x 2 = _____	
FAC species _____ x 3 = _____	
FACU species _____ x 4 = _____	
UPL species _____ x 5 = _____	
Column Totals: _____ (A)	_____ (B)
Prevalence Index = B/A = _____	

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☒ Dominance Test is >50%

☐ Prevalence Index is =3.0¹

☐ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height

Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (include photo number here or on a separate sheet.) Lowland hardwoods. Photo 67.

SOIL

Sampling Point: 62

[illegible]

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: STH 59 West Bypass

City/County: City and Town of Waukesha, Waukesha County

Sampling Date: 09/08/2011

Applicant/Owner: _____

State: WI

Sampling Point: 63

Investigator(s): Donald M. Reed, PhD., SEWRPC

Section, Township, Range: NW 1/4 Section 29, T7N, R19E

Landform (hillslope, terrace, etc.): drainage way

Local relief (concave, convex, none): concave

Slope (%): 1-4%

Lat: _____

Long: _____

Datum: _____

Soil Map Unit Name: Lamartine silt loam (LmB) Spd

NWI classification: none

Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☒ (If no, explain in Remarks)

Are Vegetation____, SoilX, or Hydrology _____ significantly disturbed?

Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation____, Soil____, or Hydrology _____ naturally problematic?

(If, needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?

☒ Yes

☐ No

Hydric Soils Present?

☒ Yes

☐ No

Wetland Hydrology Present?

☒ Yes

☐ No

Is the Sampled Area
within a Wetland?

☒ Yes

☐ No

If yes, optional Wetland Site ID: PCA No. 32

Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Ditched waterway.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Secondary Indicators (minimum of two required)

☒ Surface Water (A1)

☐ High Water Table (A2)

☐ Saturation (A3)

☐ Water marks (B1)

☐ Sediment Deposits (B2)

☒ Drift Deposits (B3)

☐ Algal Mat or Crust (B4)

☐ Iron Deposits (B5)

☐ Inundation Visible on Aerial Imagery (B7)

☐ Sparsely Vegetated Concave Surface (B8)

☒ Water-Stained Leaves (B9)

☐ Aquatic Fauna (B13)

☐ Marl Deposits (B15)

☐ Hydrogen Sulfide Odor (C1)

☐ Oxidized Rhizospheres on Living Roots (C3)

☐ Presence of Reduced Iron (C4)

☐ Recent Iron Reduction in Tilled Soils (C6)

☐ Thin Muck Surface (C7)

☐ Other (Explain in Remarks)

☐ Surface Soil Cracks (B6)

☐ Drainage Patterns (B10)

☐ Moss Trim Lines (B16)

☐ Dry-Season Water Table (C2)

☐ Crayfish Burrows (C8)

☐ Saturation Visible on Aerial Imagery (C9)

☐ Stunted or Stressed Plants (D1)

☒ Geomorphic Position (D2)

☐ Shallow Aquitard (D3)

☐ Microtopographic Relief (D4)

☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 15

Water Table Present? Yes ☐ No ☐ Depth (inches): _____

Saturation Present? Yes ☐ No ☐ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		Prevalence Index worksheet: <div style="display: flex; justify-content: space-between;"> <u>Total % Cover of:</u> <u>Multiply by:</u> </div> OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: 5' radius)				
1. <u>Phalaris arundinacea</u>	<u>80</u>	<input checked="" type="checkbox"/>	<u>FACW</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is =3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must Be present, unless disturbed or problematic.
2. <u>Typha latifolia</u>	<u>20</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
6. _____	_____	<input type="checkbox"/>	_____	
7. _____	_____	<input type="checkbox"/>	_____	
8. _____	_____	<input type="checkbox"/>	_____	
9. _____	_____	<input type="checkbox"/>	_____	
10. _____	_____	<input type="checkbox"/>	_____	
11. _____	_____	<input type="checkbox"/>	_____	
12. _____	_____	<input type="checkbox"/>	_____	
	<u>100</u>	= Total Cover		
Woody Vine Stratum (Plot size: 30' radius)				
1. _____	_____	<input type="checkbox"/>	_____	
2. _____	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
	<u>0</u>	= Total Cover		Definitions of Vegetation Strata: Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: (include photo number here or on a separate sheet.) Fresh (wet) meadow. Photo 68.				

Sampling Point: 63

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

²Location: PL=Pore Lining, M=Matrix

Indicators for Problematic Hydric Soils³:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)

- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LLR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LLR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☒ Other (Explain in Remarks)

³Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: Soils inundated with 15" of water, hydric by definition - Criteria 3.

Photo 1: Sample point 1



Photo 2: Sample point 2



Photo 3: Sample point 3



Photo 4: Sample point 4



Photo 5: Sample point 5



Photo 6: Sample point 6



Photo 7: Sample point 7



Photo 8: Sample point 8



Photo 9: Sample point 9



Photo 10: Sample point 10



Photo 11: Sample point 11



Photo 12: Sample point 12



Photo 13: Sample point 13



Photo 14: Sample point 14



Photo 15: Sample point 15



Photo 16: Sample point 16



Photo 17: Sample point 17



Photo 18: Sample point 18 crayfish holes



Photo 19: Sample point 18



Photo 20: Sample point 19



Photo 21: Sample point 20



Photo 22: Sample point 21



Photo 23: Sample point 22 shallow roots



Photo 24: Sample point 22 shallow roots



Photo 25: Sample point 22



Photo 26: Sample point 23



Photo 27: Sample point 24



Photo 28: Sample point 25



Photo 29: Sample point 26



Photo 30: Sample point 27



Photo 31: Sample point 28



Photo 32: Sample point 29



Photo 33: Sample point 30



Photo 34: Sample point 31



Photo 35: Sample point 32



Photo 36: Sample point 33



Photo 37: Sample point 34



Photo 38: Sample point 35



Photo 39: Sample point 36



Photo 40: Sample point 37



Photo 41: Sample point 38



Photo 42: Sample point 39



Photo 43: Sample point 40



Photo 44: Sample point 41



Photo 45: Sample point 42



Photo 46: Sample point 43



Photo 47: Sample point 44



Photo 48: Sample point 45



Photo 49: Sample point 46



Photo 50: Sample point 47



Photo 51: Sample point 48



Photo 52: Sample point 49



Photo 53: Sample point 50



Photo 54: Sample point 51

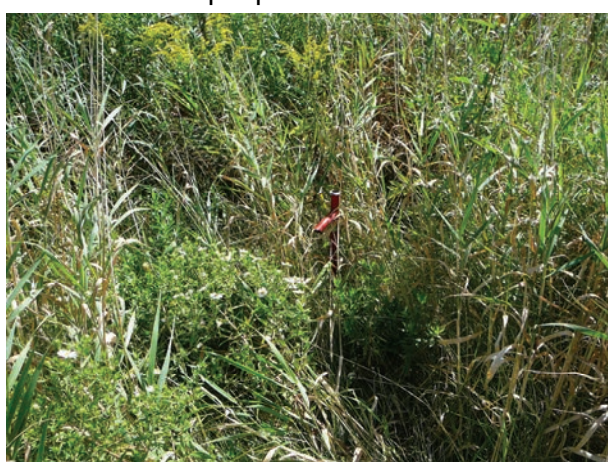


Photo 55: Sample point 52



Photo 56: Sample point 53



Photo 57: Sample point 54

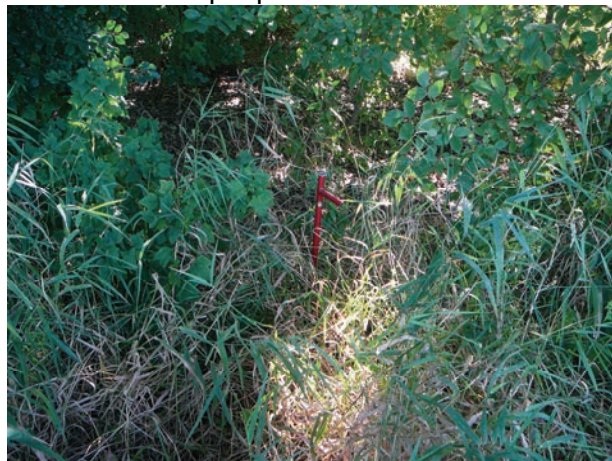


Photo 58: Sample point 55



Photo 59: Sample point 56



Photo 60: Sample point 57 algae crust



Photo 61: Sample point 57 algae crust



Photo 62: Sample point 57



Photo 63: Sample point 58



Photo 64: Sample point 59



Photo 65: Sample point 60



Photo 66: Sample point 61



Photo 67: Sample point 62

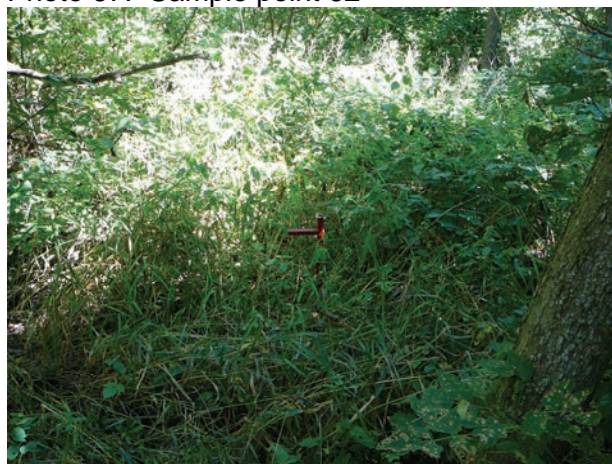


Photo 68: Sample point 63



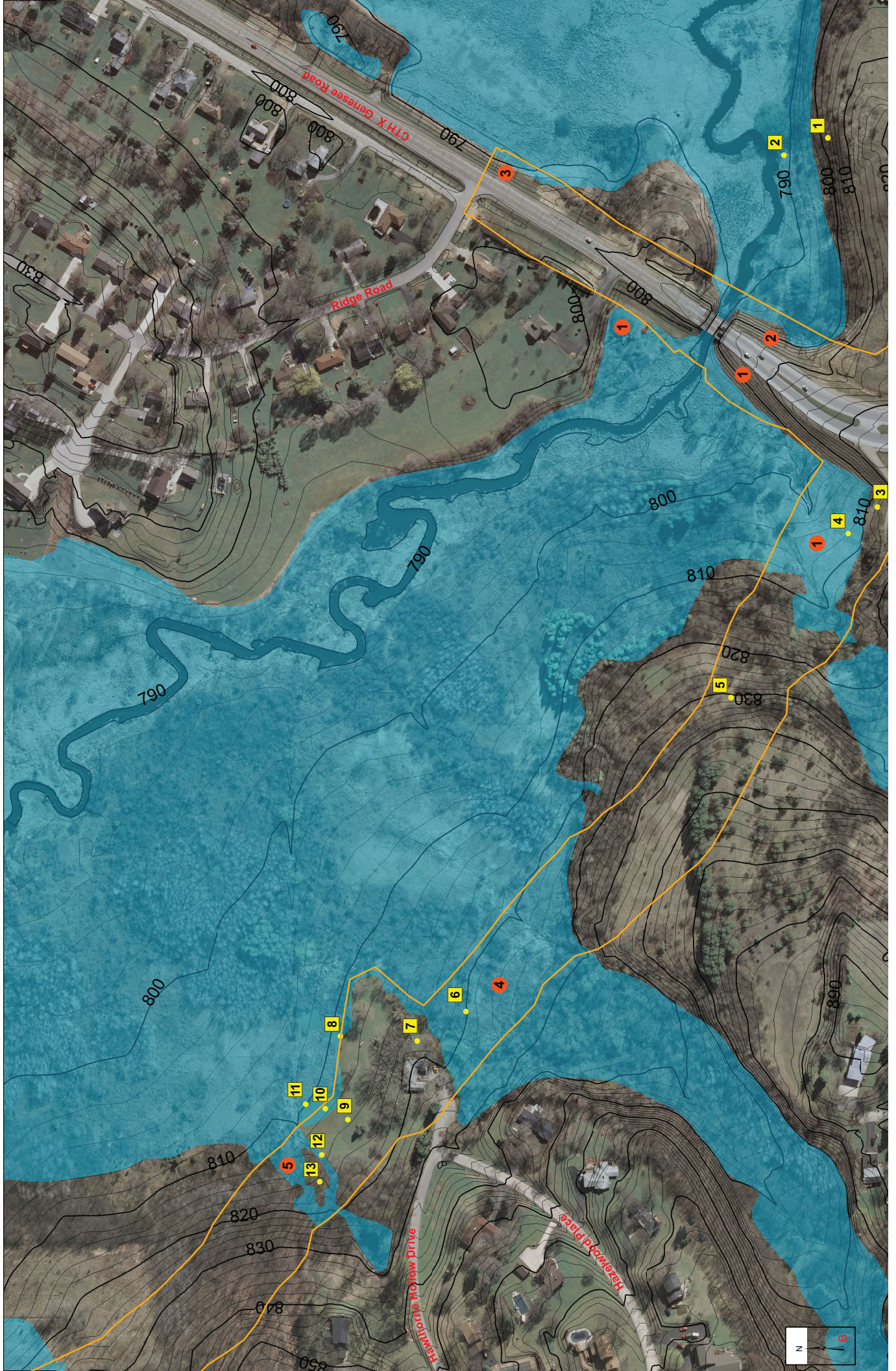


Proposed Waukesha West Bypass
Sections 5, 6, 7, 8 and 17, T06N-R19E
Sections 29, 30, 31 and 32, T07N-R19E
City and Town of Waukesha and City of Pewaukee, Waukesha County

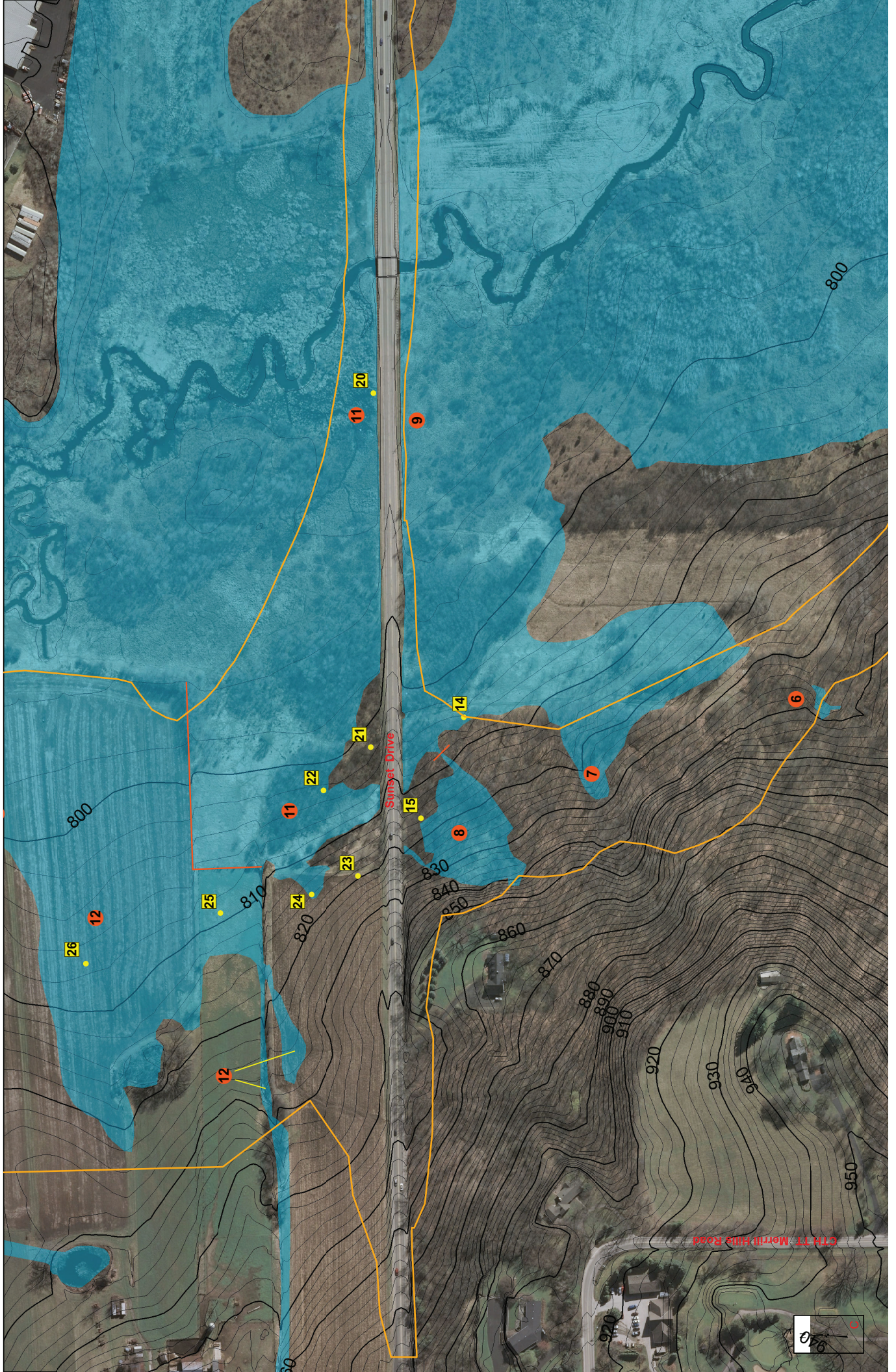
Legend

- Project Area
- Wetland
- Plant Community Number
- Plant Community Boundary
- Sample Site
- Sample Number

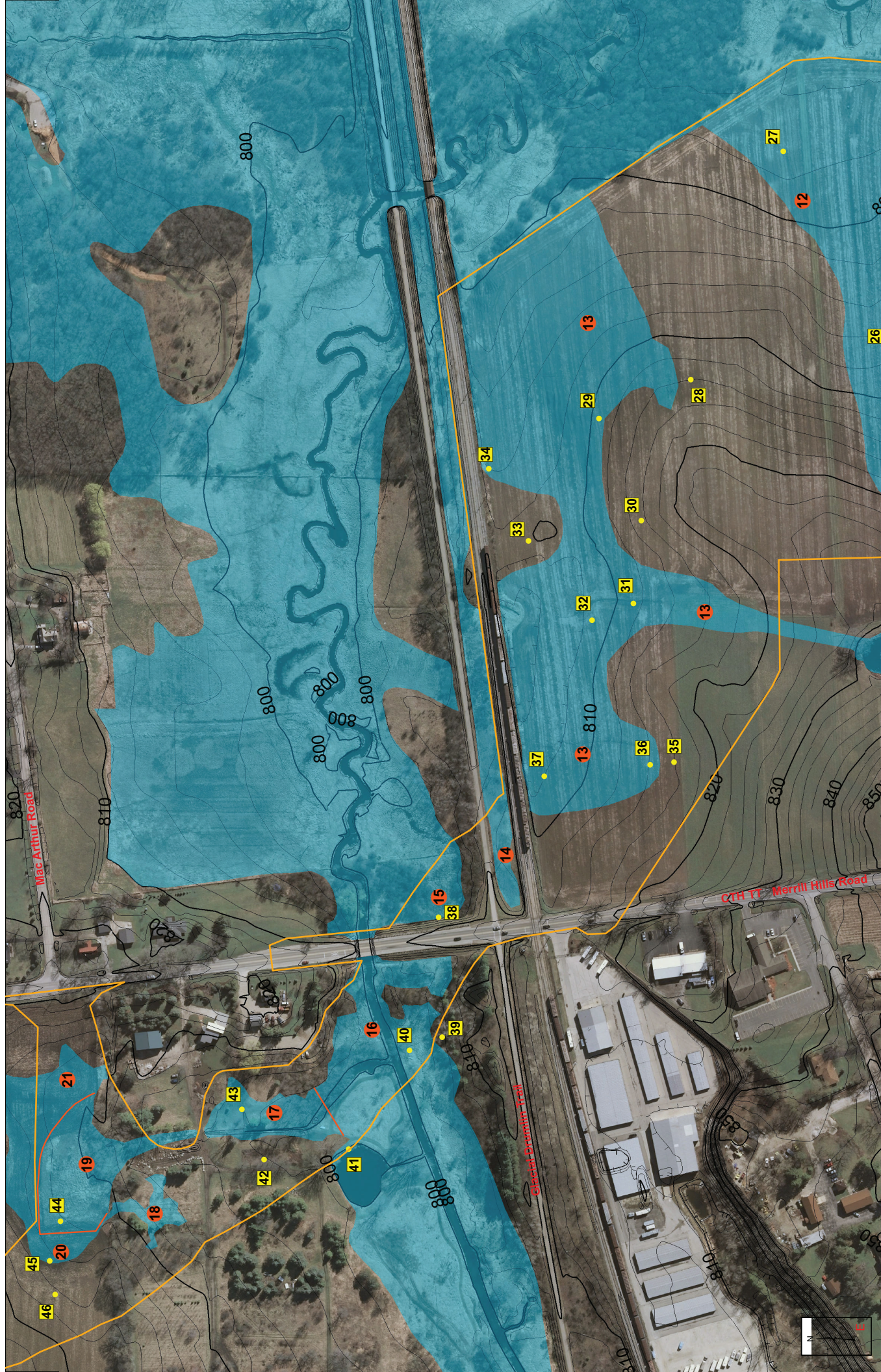
Wetland Boundaries Staked by SEWRPC on
8/4, 8/25, 8/30, 9/6, 9/8, 11/8, 11/15, and 1/29/2011

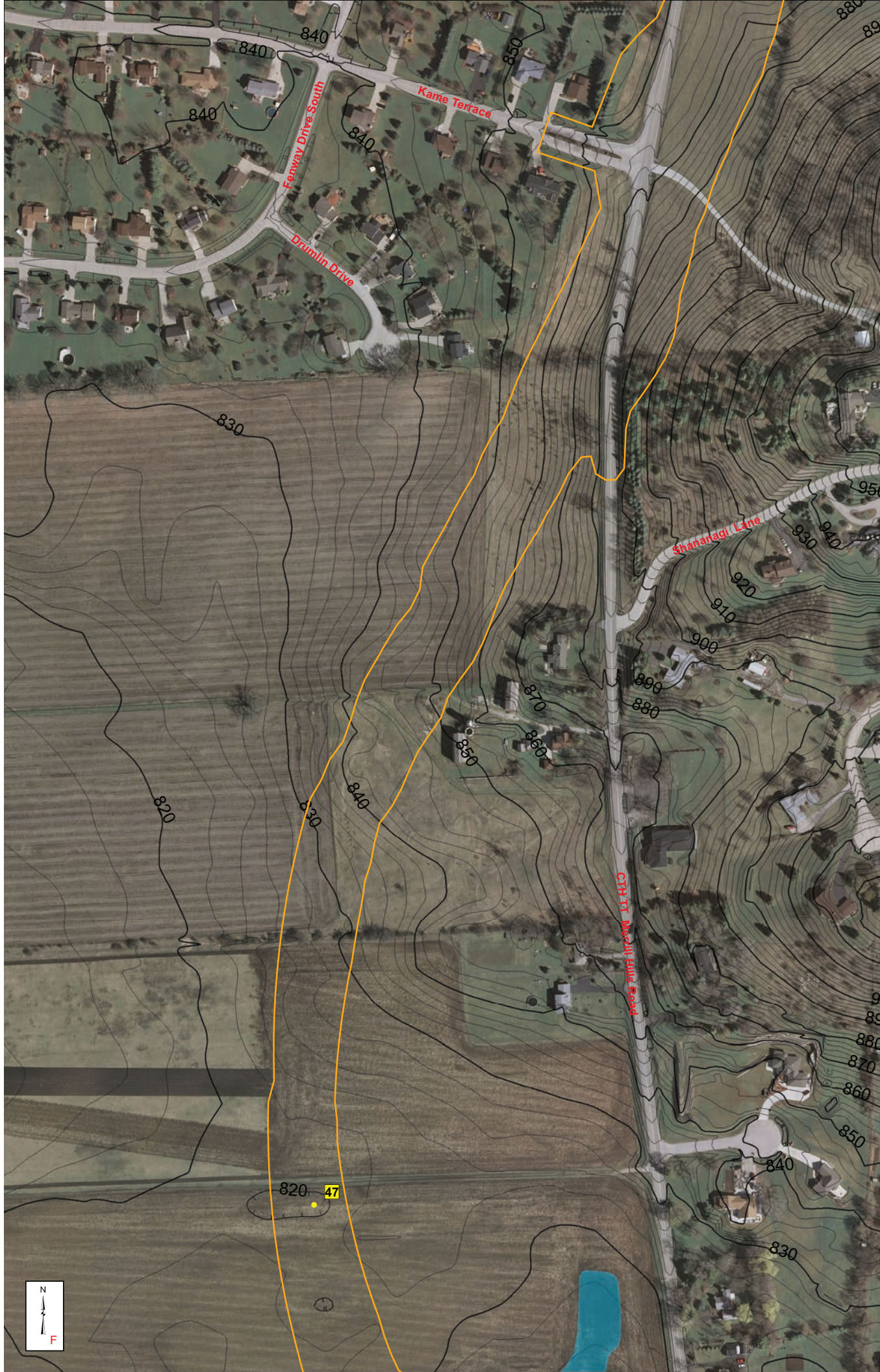


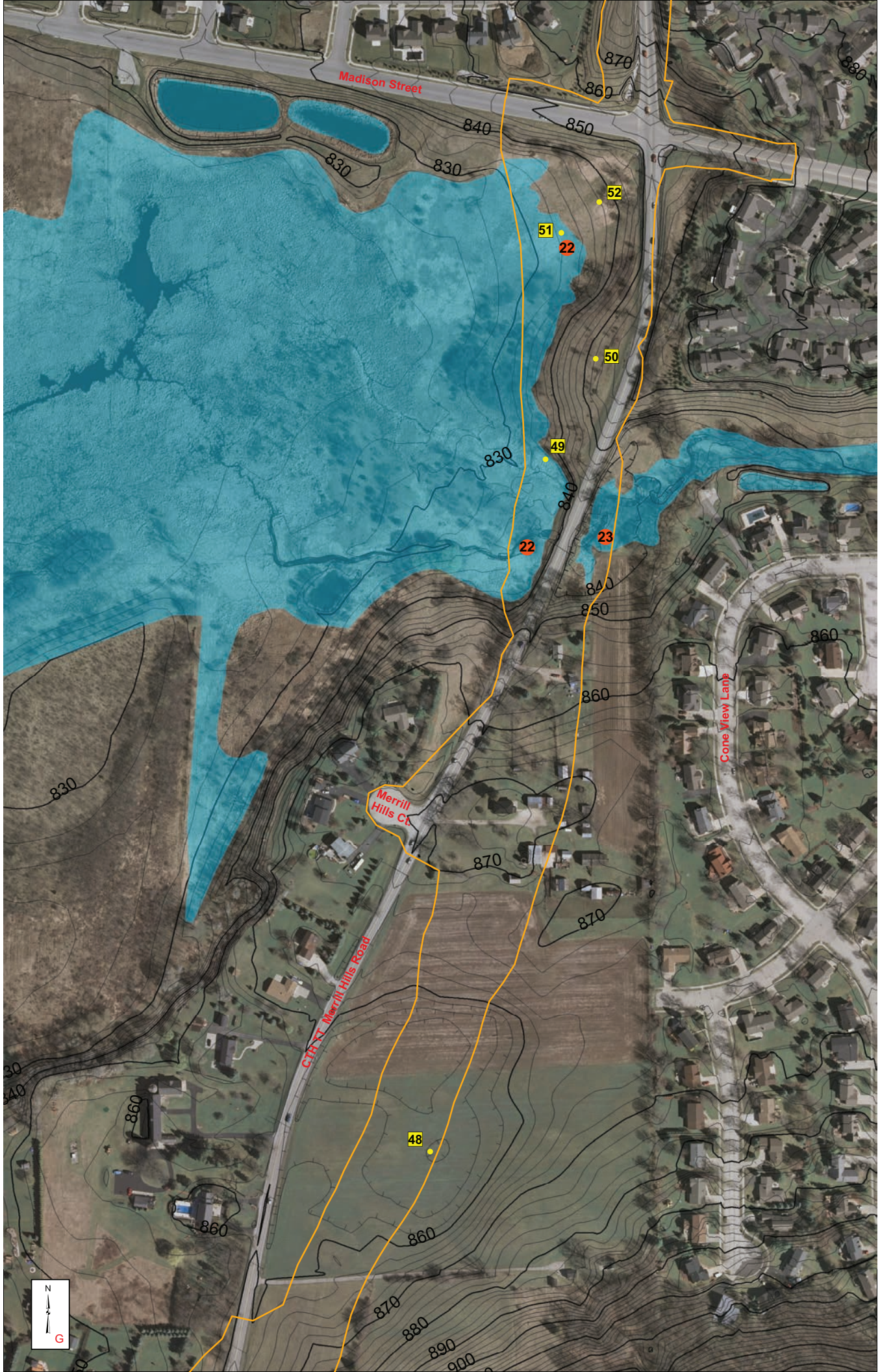
Sunset Drive















60

30

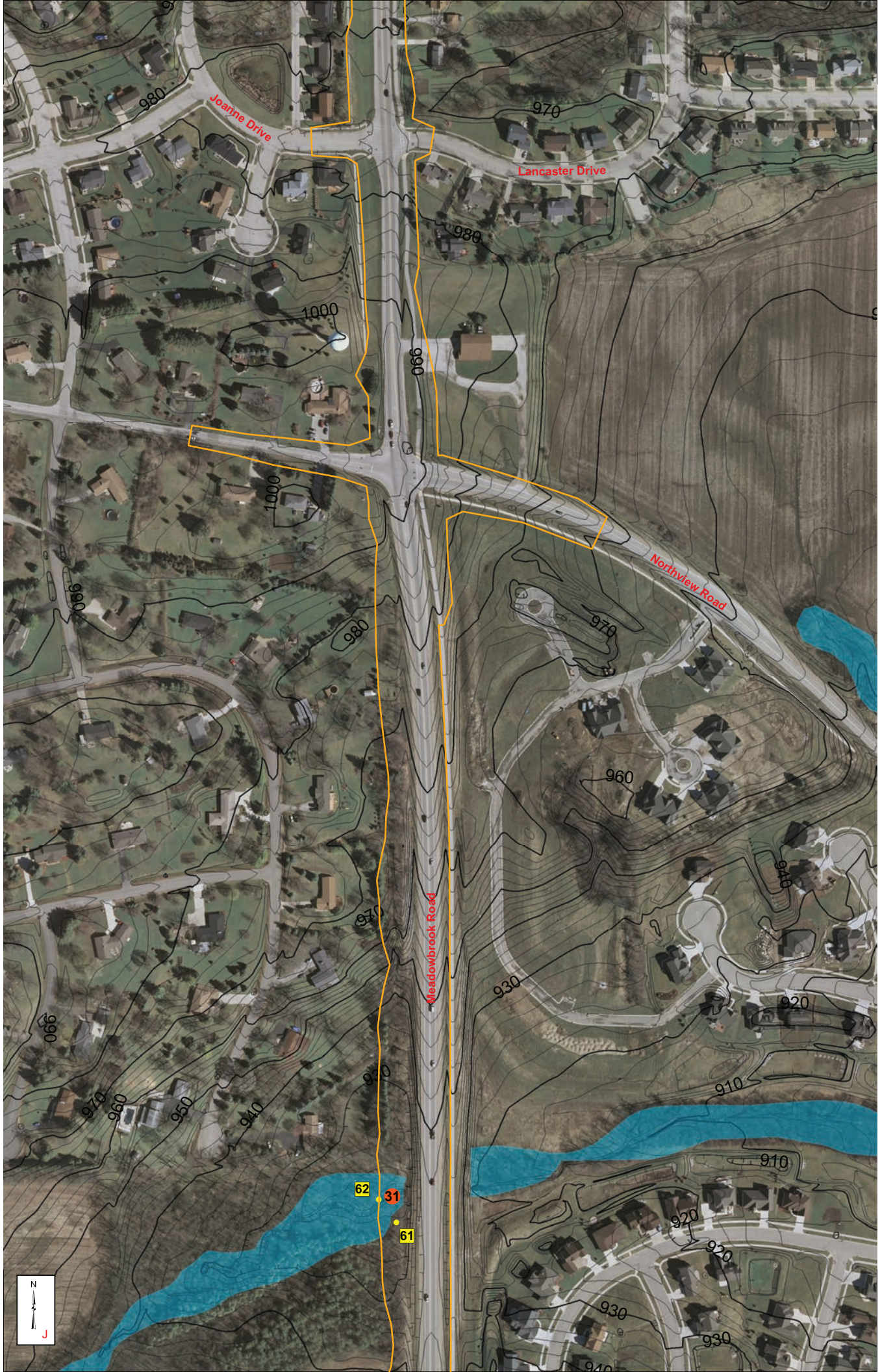
29

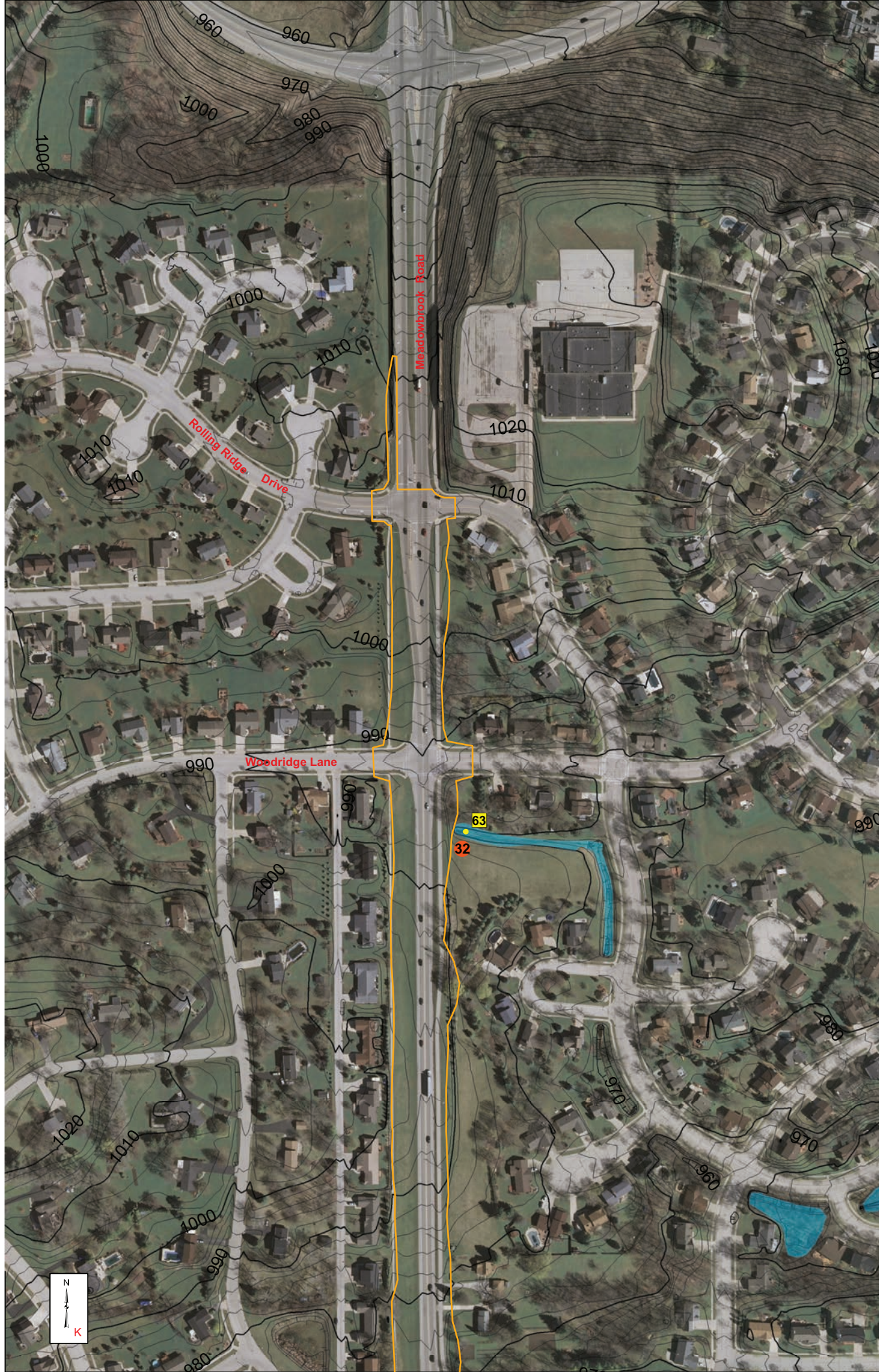
58

59

Meadowbrook Road

Coldwater Creek Drive





Subsurface Exploration and Geotechnical Evaluation, Summit Road to Genesee Road Alternative Alignments – Waukesha West Bypass

PREPARED FOR: Waukesha County

PREPARED BY: Charles J. Winter, P.E./CH2M HILL

DATE: August 26, 2011, revised January 9, 2012

PROJECT NUMBER: 401308.WB.DE.03

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2. Plan Alignment and Profile – Pebble Creek West Alternative
3. Soil Boring Location Diagram

B. Drilling Procedures and Boring Logs

General Drilling Notes and Soil Classification System

Boring Logs 2011-01 through 2011-11

C. Laboratory Test Results

Laboratory Test Results

1. Introduction and Purpose

Waukesha County is considering three alternatives for the proposed west Waukesha bypass between Sunset Drive and State Highway 59 in Waukesha County, Wisconsin. The site location is provided in Figure 1 of Attachment A.

One alignment, termed “Pebble Creek Mapped Route” (PCMR), was originally proposed to approximately parallel Pebble Creek, offset approximately 300 to 500 feet to the west. This alignment, while still under consideration at the time of the subsurface exploration, has since been abandoned. However, subsurface conditions and recommendations for this alignment are contained in this technical memorandum in the event this alignment is reconsidered.

A second alignment, termed “Pebble Creek West” alternative (PCW), proposes extending a roadway through a combination of uplands and lowlands through the Pebble Creek area, approximately 200 to 400 feet west of the Pebble Creek Mapped Route. The plan alignment and tentative elevation profile are provided in Figure 2 of Attachment A. Subsurface exploration detailed herein was executed to evaluate the feasibility of this alignment.

A third alignment, termed “Sunset Drive to County X” is also being considered; this alternative avoids roadway construction through the Pebble Creek area and therefore is not addressed in this technical memorandum.

The purpose of this technical memorandum is to evaluate the subsurface conditions along both the Pebble Creek Mapped Alignment and the Pebble Creek West Alternative for support of embankments and roadway pavement. Construction consideration issues are also presented.

2. Subsurface Exploration and Laboratory Testing Programs

2.1 Subsurface Exploration Program

Eleven soil borings (denoted 2011-01 through 2011-11) were located and drilled by CH2M HILL based on the area proposed for both the Pebble Creek West Alternative and the Pebble Creek Mapped Route alignments. The locations were reviewed with the Wisconsin Department of Natural Resources (WDNR) staff to avoid areas deemed to have considerable ecological significance, and were done during the winter season to minimize impact to vegetation. Borings 2011-01 through 2011-07 were located to evaluate various portions of the Pebble Creek Mapped Route; Borings 2011-08 through 2011-11 were selected to evaluate various portions of the Pebble Creek West Alternative. The borings were staked and ground surface elevations measured using survey methods by Kapur and Associates, Inc. (Kapur) of Milwaukee, Wisconsin. All borings were drilled on-location, therefore no subsequent “as-drilled” survey was warranted. The elevation, depth, and termination elevations are presented in Table 1.

TABLE 1
Summary of Soil Borings Drilled for Pebble Creek Alternatives

Soil Boring	Alignment	Ground Surface Elevation	Boring Depth, feet	Boring Termination Elevation
2011-01	PCMR	799.6	15	784.6
2011-02	PCMR	800.2	15	785.2
2011-03	PCMR	799.9	15	784.9
2011-04	PCMR	797.4	15	782.4
2011-05	PCMR	798.3	15	783.3
2011-06	PCMR	812.0	15	797.0
2011-07	PCMR	800.6	15	785.6
2011-08	PCW	821.9	15	806.9
2011-09	PCW	809.0	15	794.0
2011-10	PCW	849.6	15	834.6
2011-11	PCW	823.0	15	808.0

PCMR = Pebble Creek Mapped Route

PCW = Pebble Creek West

Boring locations are depicted on the Soil Boring Location Diagram in Figure 3 of Attachment A, and borehole coordinates are presented on the respective boring log in Attachment B.

The borings were drilled by GESTRA Engineering, Inc. (GESTRA) between February 23 and February 25, 2011. The borings were advanced using an ATV-mounted rotary drill rig. The borings were advanced using hollow-stem augers.

Sampling was performed at approximate 2.5-foot intervals. Most samples were obtained by driving a split-spoon (SS) sampler during Standard Penetration Tests (SPT), in general accordance with ASTM D1586. A limited number of thin-walled (Shelby Tube) "ST" samples were also obtained, in general accordance with ASTM D1587.

The driller maintained a field log that described sample recovery, and also documented sample intervals, field test data, and observations of drilling resistance, groundwater occurrence, and other pertinent conditions. Representative portions of recovered samples were subsequently containerized, sealed, labeled, and then transported to the laboratory for further examination and testing. All borings were backfilled with bentonite upon completion, in accordance with Wisconsin Department of Natural Resources (WNDR) requirements. General drilling notes are contained in Attachment B.

2.2 Laboratory Testing Program

A laboratory testing program was undertaken after drilling completion. The program included visual sample examination and classification testing. Each SS sample was visually

examined by a geotechnical engineer who estimated the distribution of grain sizes, plasticity, consistency, moisture condition, color, presence of lenses and seams, and apparent geologic origin. The soils were classified in general accordance with ASTM D2488 “Standard Practice for Description and Identification of Soils.” A chart describing this classification system is included in Attachment B.

After visual classification, laboratory testing was performed on selected samples. Table 2 provides a summary of the testing performed, the ASTM standard followed, and the results of the testing. The visual soil classifications were compared with results of the Atterberg limits, and particle size distribution tests and appropriate changes made to the boring logs.

TABLE 2
Laboratory Tests Performed

Laboratory Test	ASTM Designation	Number of Tests	Range of Results
Water Content	ASTM D2216	51	8 to 432%
Loss-on-Ignition (LOI) (Organic Content)	ASTM T297	11	LOI = 2 to 68%
Particle Size Distribution	ASTM D422	3	Refer to lab results
Unconfined Compression	ASTM D2166	5	0.5 to 1.0 tsf ^A
Unit Weight	ASTM D4318	5	Dry = 91 to 114 pcf ^A , Moist = 132 to 138 pcf

^A tsf = tons per square foot, pcf = pounds per cubic foot

Results of laboratory testing are presented in Attachment C.

3. Site Information

3.1 Topographic Information

The existing ground surface along the alignment of the Pebble Creek Mapped Route is generally flat, with ground surface elevations ranging from 796 to 804. The existing ground surface along the alignment of the Pebble Creek West Alignment has considerably more relief, with ground surface elevations ranging from 806 to 844.

3.2 Existing Subsurface Information

Existing subsurface information for the Pebble Creek corridor was reviewed from the following sources:

- 1 Pebble Creek Ground Water Monitoring and Surface Water Screening – Waukesha Bypass Corridor, prepared for Waukesha County / CH2M HILL by GRAEF, 2010.
- 2 Ground Water Resources of Southern Wisconsin; South Eastern Wisconsin Regional Planning Commission (SEWRPC), 2002.
- 3 Ground-Water Resources of Waukesha County, Wisconsin; United States Geological Survey Information Circular Number 29, 1975.

4 Soil Survey of Milwaukee and Waukesha Counties, Wisconsin; United States Department of Agriculture, 1971.

The above information primarily concentrated on the groundwater / infiltration properties of the existing site soils and existing vegetation. Soil samples taken in the GRAEF (2010) report and in the USDA Soil Survey (1971) were primarily taken from the upper five feet utilizing hand augers, while the other references provide regional information. The information, while useful from a qualitative perspective, does not provide engineering data from which to make a structural evaluation regarding the appropriateness of the site soils to support embankment and roadway loads.

3.3 Regional Geology

The valley in which Pebble Creek runs is situated between highlands to the east and west. The soils within the valley are mostly post-glacial alluvial and estuarine deposits, while the soils comprising the uplands are predominantly glacial, consisting predominantly of till soils comprising what is likely a drumlin glacial formation. Glacial soil deposits were reported by the SEWRPC report (2002) as having thickness ranging from 50 to 150 feet.

A more-detailed description of the geological history of the site is contained in the GRAEF (2010) project report.

3.4 Soil Survey Information

The surficial soils along both the Pebble Creek Mapped Route and the Pebble Creek West alignments between Sunset and Genesee Roads were classified through the USDA soil survey (1971). The soils underlying the Pebble Creek Mapped Route were classified within the following soil series: Sebewa silt loam (Sm), Houghton muck (HtB), Brookston silt loam (BsA), and Lamertine silt loam (LmB).

The soils underlying the Pebble Creek West alignment were classified within the following soil series: Brookston silt loam (BsA), Wallkill silt loam (Wa), Lamertine silt loam (LmB), Pistakee silt loam (PrA), and Hochheim loam (HmC2).

With the exception of the Houghton muck, these soil units are typically described as comprised of fine-grained soils, namely silt and clay. Houghton muck is described as containing predominantly peat and other high-organic soil.

The soils encountered in the upper five feet of the borings drilled for this exploration generally agree with the soil units previously identified. Exceptions to this were the upper few feet of Borings 2011-01, 2011-05, and 2011-06, where the borings encountered significant peat and/or highly organic clay soil deposits.

It should be emphasized that the soil survey is conducted primarily to address vegetation, infiltration, and drainage issues and is not designed to serve geotechnical applications. Therefore, we recommend that pavement, earthwork, and structural designs be predicated on the boring logs contained in this report and on future geotechnical borings.

3.5 Soil and Groundwater Conditions Encountered During Exploration

3.5.1 Pebble Creek Mapped Route

The borings drilled along the Pebble Creek Mapped Route (borings 2011-01 through 2011-07) encountered organic surficial soils (likely post-glacial alluvial and/or estuarine

deposits) overlying alternating layers of granular, fine-grained non-cohesive, and fine-grained cohesive deposits. The underlying deposits are likely glacial in origin, consisting of glacial fine-grained till units with seams and layers of coarser-grained outwash deposits.

The surficial soils, extending to depths ranging from 2 to 5 feet, included considerable organic matter, with loss-on-ignition (organic content) values ranging from 2.1 to 65 percent, and water contents ranging from 31 to 432 percent. The higher organic content and higher water content values were from peaty soils encountered in borings 2011-01, 2011-06, and 2011-07. Unconfined compressive strengths of cohesive portions of these soils ranged from less than 0.25 tons per square foot (tsf) to 1.0 tsf. These soils are weak, highly compressible, and easily disturbed. These soils are typically not considered suitable for support of embankments and/or pavements in their present state.

Soils underlying the surficial soils described above consisted of a relatively thin layer of clay over alternating layers of granular and cohesive soils. The upper clay soil, which typically extended to a depth of 5 feet, had unconfined compressive strengths on the order of 0.5 to 1.5 tsf, with water contents ranging from 15 to 30 percent. These soils have low to moderate strength, are moderately compressible, and are easily disturbed. These soils will be of adequate strength to support embankments and/or pavements. Given the easily disturbed nature of these soils, careful construction methods will need to be employed to minimize disturbance to these soils.

The underlying cohesive soil layers typically had the composition of lean clay, with strengths ranging from 0.75 to 3.0 tsf, with water contents ranging from 8 to 25 percent. The underlying non-cohesive soils, comprised of silt, sandy silt, silty sand, or fine-to-coarse sand, had relative densities ranging from loose to dense. All of these underlying soils have moderate to high strength, and have low to moderate compressibility. These soils are suitable for structural support of an embankment and roadway, although the finer-grained soils, especially the weaker lean clay and the silt, will be highly prone to disturbance and therefore will need careful construction methods to minimize disturbance to the subgrade.

Groundwater was encountered in each boring drilled along the Pebble Creek Mapped Route, at depths ranging between zero (i.e., surface) and 10 feet (corresponding to elevations between 788.3 and 812.0). Given the close areal and vertical proximity to Pebble Creek, it is likely that the groundwater table is very shallow, likely slightly higher than Pebble Creek. The granular soils encountered at shallow depths are likely hydraulically connected with Pebble Creek.

3.5.2 Pebble Creek West Alternative

The borings drilled along the Pebble Creek West alternative alignment (Borings 2011-08 through 2011-11) encountered predominantly clayey soils at the surface underlain with a variety of fine-grained and coarse-grained soils. All of the soils are likely of glacial origin.

The surficial clayey soils typically consisted of a thin layer of clayey topsoil underlain with lean clay and silty clay. These soils extended to depths ranging from 5 to 10 feet. The clays had unconfined compressive strengths ranging from 0.25 to 1.0 tsf, with the weaker soils typically at the surface. Water contents ranged from 13 to 35 percent, with the higher values present near the surface. With the exception of the surficial topsoil layer, these soils should have adequate strength to support an embankment and/or roadway, and have low to

moderate compressibility. These soils' susceptibility to disturbance will be largely dependent on the location of the groundwater table; soils significantly above the groundwater table will be considerably less susceptible to disturbance than soils marginally above or below the groundwater table.

The underlying soils were stratified into layers comprised of clayey sand, fine sand, silty sand, gravel, silty clay and lean clay. The granular portions of these materials had relative densities in the loose to dense range, with densities typically increasing with depth. The cohesive portions had unconfined compressive strengths ranging from 1.0 to 3.25 tsf, and water contents ranging from 9 to 20 percent. These soils should have adequate strength to support an embankment and/or roadway, and have low to moderate compressibility. These soils' susceptibility to disturbance will be largely dependent on the location of the groundwater table; soils significantly above the groundwater table will be considerably less susceptible to disturbance than soils marginally above or below the groundwater table.

Groundwater was encountered during drilling at depths ranging from 6.5 to 10 feet (corresponding to elevations between 799 and 816.5), with the exception of Boring 2011-10, which did not encounter groundwater at the termination depth of 15 feet (Elevation 834.6). It should be noted that the occurrence of groundwater within these borings may represent the location of saturated granular soil layers and may not be necessarily indicative of the groundwater table. Also, given the location of these borings on the side of a significant hill, the occurrence of groundwater may be indicative of a perched condition (where groundwater is ponded on top of a low-permeability clay layer) and not indicative of the groundwater table.

4. Recommendations

4.1 Pebble Creek Mapped Route

The soils encountered from the ground surface to a typical depth of 5 feet in the borings drilled along the Pebble Creek Mapped Route are generally not suitable for support of either embankment or roadway in their present condition. These soils will likely need to be removed during construction and replaced with suitable fill material. When these soils are removed, it will be difficult to establish and maintain a stable subgrade on which to properly place and compact fill material. A separation material, such as a non-woven geotextile, will need to be placed at the bottom of the overexcavation to minimize the migration of the structural fill into the weaker subgrade soil. The "suitable" subgrade soils (as described in the Soils and Groundwater discussion above) are highly prone to construction disturbance, and therefore construction will need to be coordinated so that only a small area is exposed at a time (i.e., avoid mass excavation). This will result in higher-than-typical construction costs. In addition, the close proximity to Pebble Creek and the likely hydraulic connectivity between the soils along the alignment and the creek will make it difficult to dewater these soils to create the overexcavation.

Depending on the construction schedule and the proposed roadway grade, it may be possible to adequately improve the poor soils in-situ by means of a surcharge program. A surcharge program involves temporarily placing a large amount of fill (likely more fill than would otherwise be required for the finished embankment) and letting the compressible soils equilibrate (i.e., settle) under the imposed load. The operation could be configured to

be a “rolling surcharge” where the same surcharge material is advanced along the alignment, hence minimizing the amount of surcharge material needed¹.

The surcharge material would likely need to be in place (at any given location) for a time ranging between one week to perhaps over a month, depending on the surcharge load and the soil types being compressed¹. Survey points will need to be established (and periodically monitored) to evaluate the amount of settlement and incremental trends. After the soils have exhibited sufficient settlement, the surcharge is removed and the embankment and pavement constructed. There is a risk that, even with the surcharge program, higher-than-typical settlements may still be incurred post-construction, thus decreasing pavement life and increasing maintenance costs.

The above evaluation was made based on a limited number of borings, is intended to be conceptual, and should be followed with a more-extensive exploration and engineering analyses should the Pebble Creek Mapped Route alignment be re-considered.

4.2 Pebble Creek West Alternative

The Pebble Creek West alternative will skirt the existing bluff to the west of Pebble Creek. Given the sloping ground topography, a considerable amount of earthwork will be required to facilitate a roadway. Given the preliminary roadway profile (Figure 2 Attachment A), cuts on the order of 9 feet and fills on the order of 20 feet will be required.

With a few exceptions, the soils appear to be favorable for support of roadway embankment and/or direct support of a pavement section. The notable exceptions would be the upper two to three feet of 2011-09, which encountered a peat seam at a depth of two feet (elevation 807), and topsoil/organic material encountered in the upper two feet of 2011-11. Similar thin removals may also be incurred at other places along the alignment, especially in the lower-lying areas.

We anticipate that, unlike the Pebble Creek Mapped Alignment, groundwater issues will not be a significant concern. Excavations made to remove soils described in the previous paragraph should not encounter the groundwater table. Proposed cut excavations may encounter saturated granular soils; however groundwater from these soils should drain relatively quickly.

5. Limitations

This technical memorandum was prepared for Waukesha County for the specific project and use discussed herein. The specific project details are unique relative to the proposed vertical and horizontal alignments. The recommendations presented herein are preliminary, and additional exploration and analyses are necessary for design of any of the roadway alternatives. If project information presented in this report changes, such changes should be reviewed by the Engineer and other design professional working on this project to confirm that these are correct for the planned use and project. It may be necessary to modify this

¹ It should be noted that since roadway profiles were not developed for the Pebble Creek Mapped Route, it was not possible to further quantify the amount of surcharge required, nor provide a refined estimate of the time period required to adequately surcharge the area. Such estimates can be developed if vertical roadway grades and lateral fill extent are developed for this alignment.

memorandum, its conclusions, and recommendations. The accuracy and completeness of any documents or information provided by others as to project specifics or prior property uses have been reasonably relied on by CH2M HILL geotechnical engineers in performing this evaluation and providing recommendations.

The analyses, conclusions, and recommendations in this memorandum are based on the subsurface conditions present in the test borings and the engineering characteristics of the soils as determined through field and laboratory testing at this point in time, as defined in the current work scope. Subsurface conditions can change over time due to both natural and man-made forces, including changes in condition or use of adjacent properties.

The memorandum does not reflect variations in subsurface conditions that may exist between or beyond these borings. Variations in soil conditions should be expected between the borings, the nature and extent of which may not become evident until construction is undertaken. The construction is recommended to be observed and tested by the geotechnical engineer or representative to determine if the subsurface conditions are as indicated by the borings and perform as anticipated.

If the conditions encountered during construction are different from those inferred by the test borings or the project details and information changes, the geotechnical engineer must be contacted to determine if modification to the recommendations presented in this memorandum are required. The recommendations presented in this memorandum are related and are not mutually exclusive of each other. Therefore, no single portion of the memorandum should be removed or be considered as a stand-alone recommendation. Boring logs must also remain with the memorandum, as they are not to be interpreted on their own.

The geotechnical engineering recommendations presented herein are an evaluation of subsoil performance based on the geotechnical engineer's experience and professional opinion. These services were performed with the degree of skill and care normally utilized by other members of the geotechnical engineering profession practicing in this location at this time. No warranty is either expressed or implied.

This memorandum is intended for geotechnical design purposes only and does not document the presence or absence of any environmental impacts at the site. Environmental services were specifically beyond the authorized scope of services covered herein.

Attachment A
Figures

Site Location Diagram

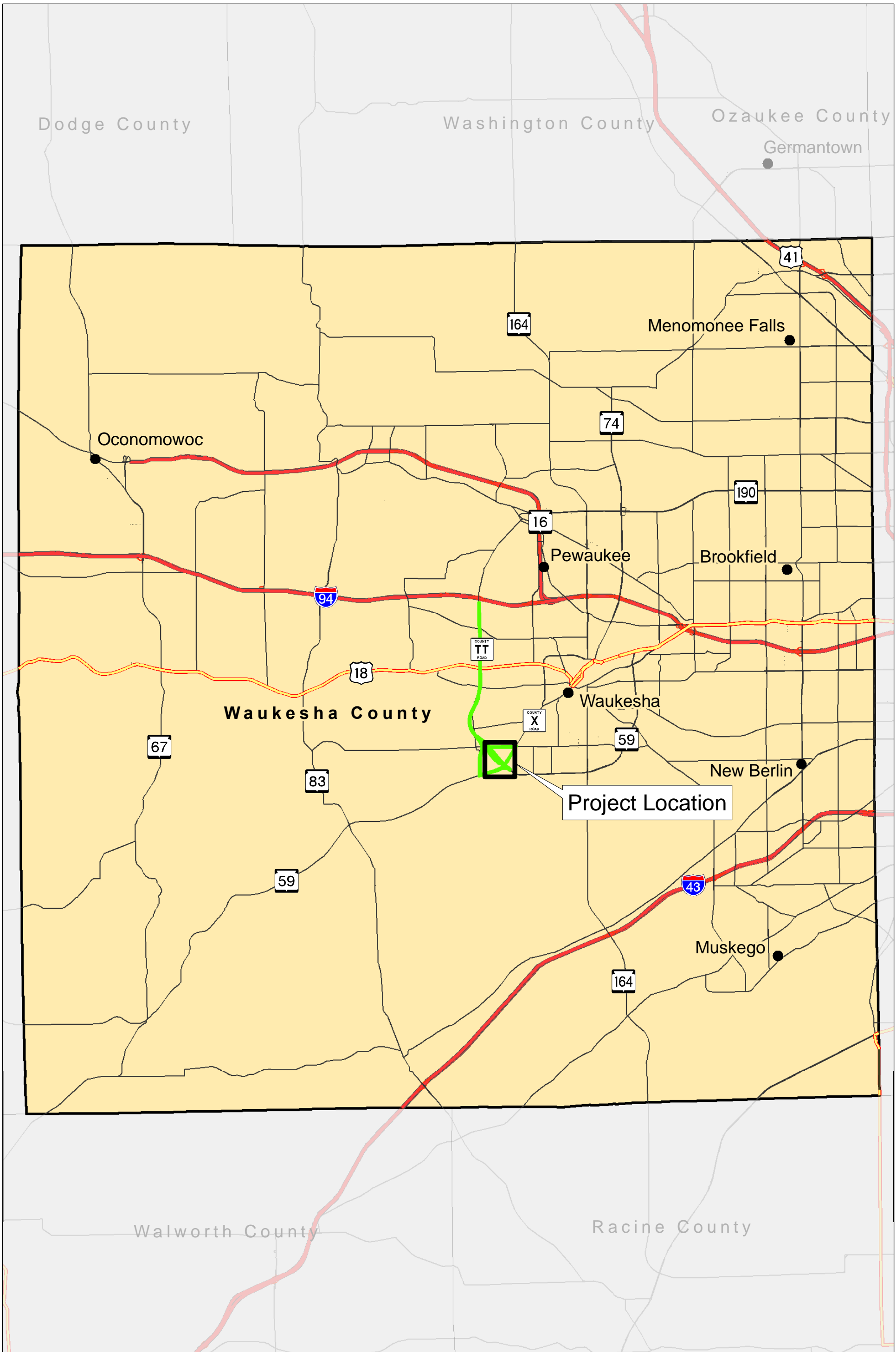


Figure 1 – Site Location Diagram
Waukesha West Bypass

July 2011

CH2MHILL

**Plan Alignment and Profile –
Pebble Creek West Alternative**

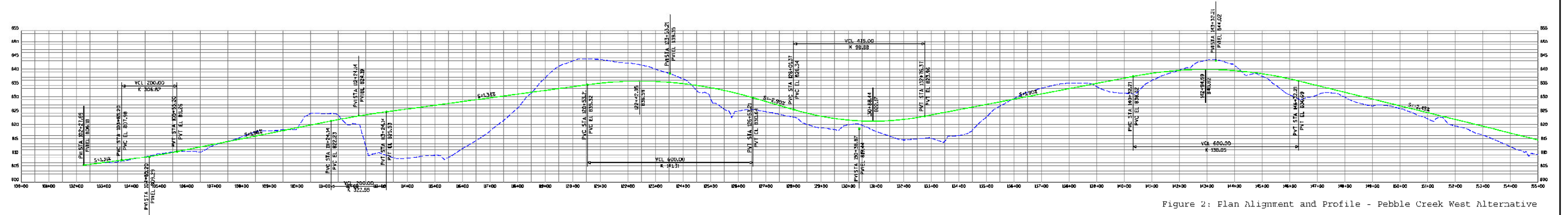
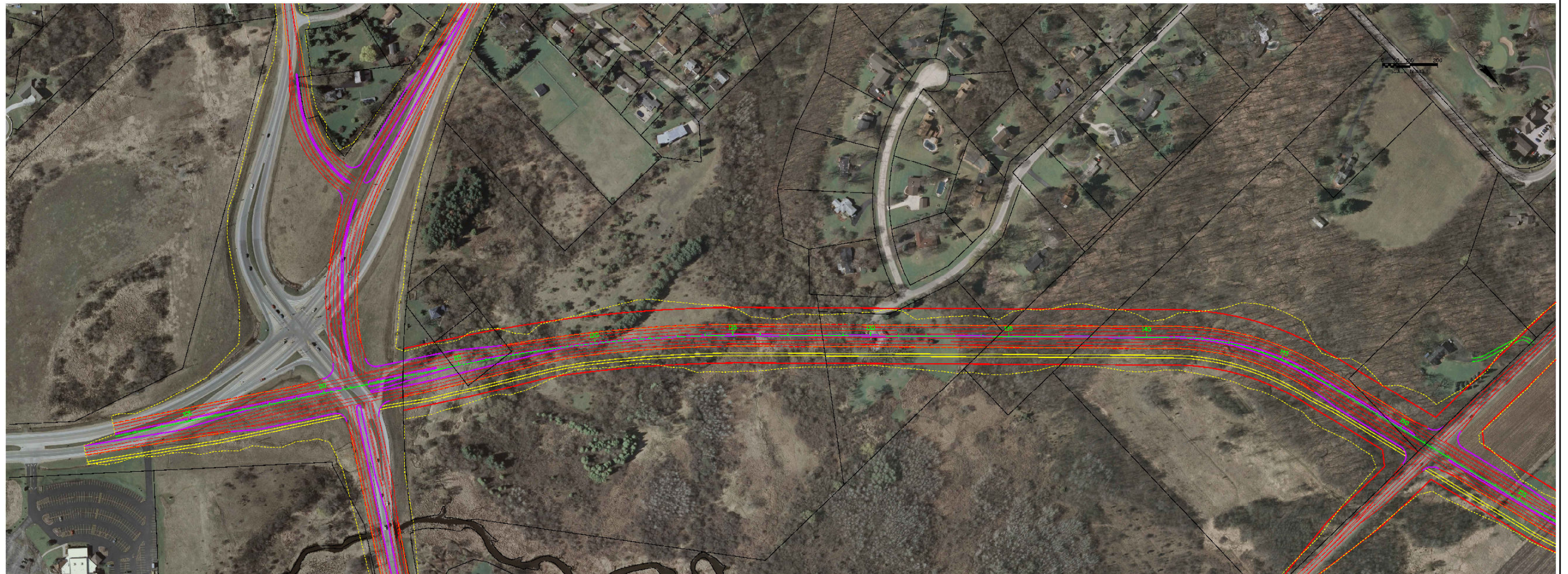
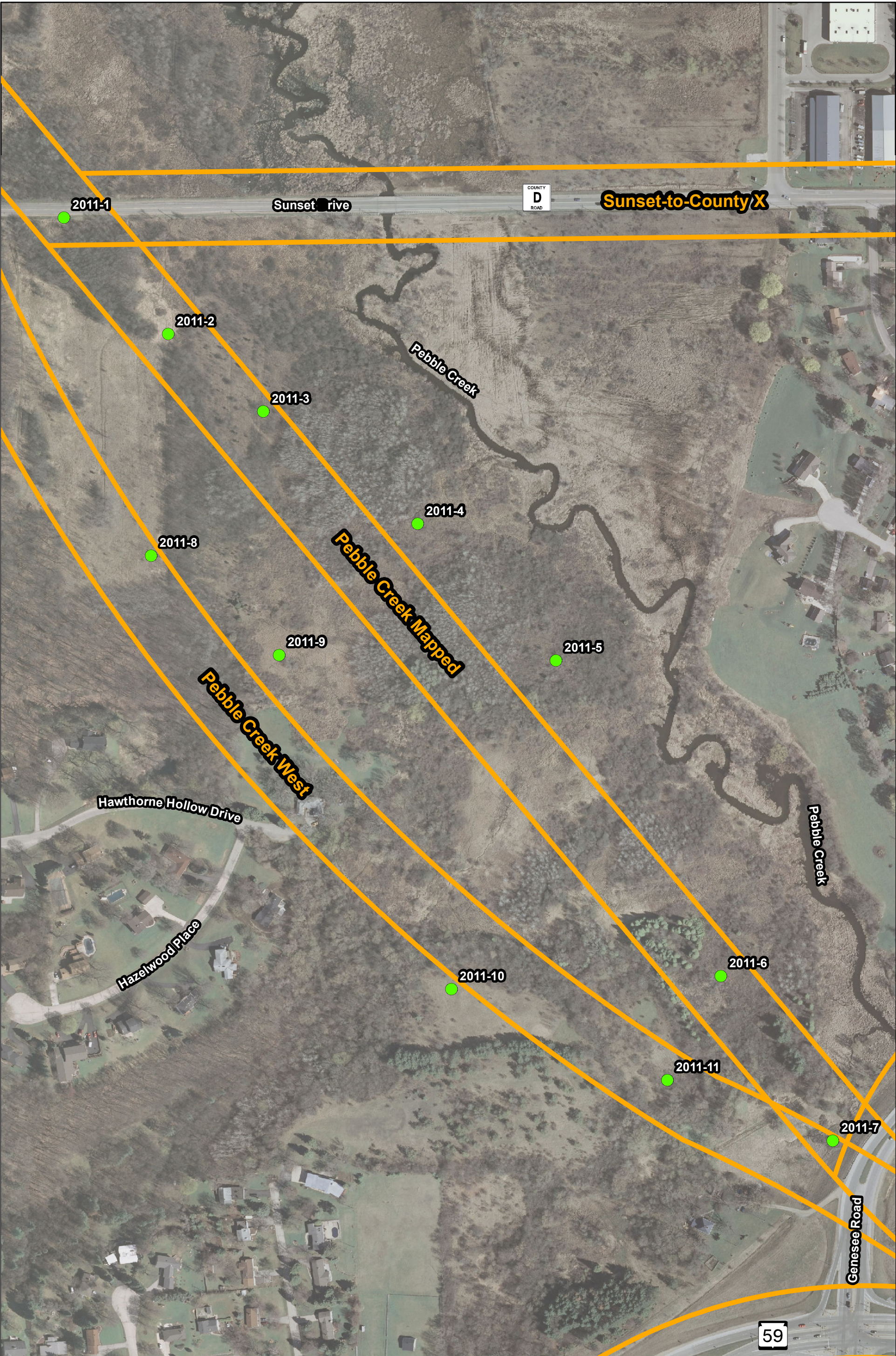


Figure 2: Plan Alignment and Profile - Pebble Creek West Alternative

Figure 2 - Plan Alignment and Profile
Pebble Creek West Alternative
Waukesha West Bypass
July 2011

Soil Boring Location Diagram



- Legend
- Soil Boring Location
 - Proposed Alternatives

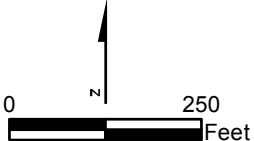


Figure 3 – Soil Boring Location Diagram
Summit Road to Genesee Road Alternative Alignments
Waukesha West Bypass
July 2011

Attachment B
Drilling Procedures and Boring Logs

General Drilling Notes and Soil Classification System

GESTRA ENGINEERING, INC. -- GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS		TEST SYMBOLS	
SYMBOL	DEFINATION	SYMBOL	DEFINATION
HSA	3 1/4" I.D. hollow Stem Auger	WC	Water Content - % of Dry Wt. – ASTM D 2216
RWB	Rotary Wash Boring (Mud Drilling)	OC	Organic Content - % of Dry Wt. – ASTM D 2974
_FA	4", 6" or 10" Diameter Flight Auger	DD	Dry Density – Pounds Per Cubic Foot
_HA	2", 4" or 6" Hand Auger	LL, PL	Liquid and Plastic Limit – ASTM D 4318
_DC	2 1/2" , 4" , 5" or 6" Steel Drive Casing		
_RC	Size A, B, or N Rotary Casing		Additional Insertions in Last Column
PD	Pipe Drill or Cleanout Tube	Qu	Unconfined Comp. Strength-psf – ASTM D 2166
CS	Continuous Split Barrel Sampling	Qp	Penetrometer Reading – Tons/Square Foot
DM	Drill Mud	Ts	Torvane Reading – Tons/Square Foot
JW	Jetting Water	G	Specific Gravity – ASTM D 854
SB	2" O.D. Split Barrel Sample	SL	Shrinkage Limits – ASTM D 427
_L	2 1/2" or 3 1/2" O.D. SB Liner Sample	OC	Organic Content – Combustion Method
ST	2" or 3" Thin Walled Tube Sample	SP	Swell Pressure - Tons/Square Foot
3TP	3" Thin Walled Tube (Pitcher Sampler)	PS	Percent Swell
_TO	2" or 3" Thin Walled Tube (Osterberg Sampler)	FS	Free Swell – Percent
W	Wash Sample	pH	Hydrogen Ion Content. Meter Method
B	Bag Sample	SC	Sulfate Content – Parts/ Million, same as mg/L
P	Test Pit Sample	CC	Chloride Content - Parts/ Million, same as mg/L
_Q	BQ, NQ, or PQ Wireline System	C*	One Dimensional Consolidation – ASTM D 2453
_X	AX, BX, or NX Double Tube Barrel	Qc*	Triaxial Compression
CR	Core Recovery – Percent	D.S.*	Direct Shear – ASTM D 3080
NSR	No Sample Recovered, classification based on action of drilling, equipment and/or material noted in drilling fluid or on sampling bit.	K*	Coefficient of Permeability – cm/sec
NMR	No Measurement Recorded, primarily due to presence of drilling or coring fluid.	D*	Dispersion test
▼	Water Level Symbol	DH*	Double Hydrometer – ASTM D 4221
		MA*	Particle Size Analysis – ASTM D 422
		R	Laboratory Receptivity, in ohm – cm – ASTM G 57
		E*	Pressuremeter Deformation Modulus – TSF
		PM*	Pressuremeter Test
		VS*	Field Vane Shear – ASTM D 2573
		IR*	Infiltrometer Test – ASTM D 3385
		RQD	Rock Quality Designation – Percent

*See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeding in reaching the water table. The available water level information is given at the bottom of the log sheet.

DESCRIPTIVE TERMINOLOGY
















DENSITY TERM	"N" VALUE	CONSISTENCY TERM	qu /qp VALUE (tsf)	"N" VALUE	Lamination	
Very Loose	0-4	Very Soft	<0.25	0-2	Layer	Up to 1/2" thick stratum
Loose	4-10	Soft	0.25 - 0.49	2-4	Lens	1/2" to 6" thick stratum
Medium Dense	10-30	Medium Stiff	0.5 - 0.99	4-8	Varved	1/2" to 6" discontinuous stratum
Dense	30-50	Stiff	1.0 - 1.99	8-16	Dry	Alternating laminations
Very Dense	Over 50	Very Stiff	2.0 - 3.99	16-30	Moist	Powdery, no noticeable water
		Hard	4.0+	Over 30	Wet	Below saturation
					Water bearing	Saturated, above liquid limit
						Pervious soil below water

Standard "N" Penetration: per ASTM D1586

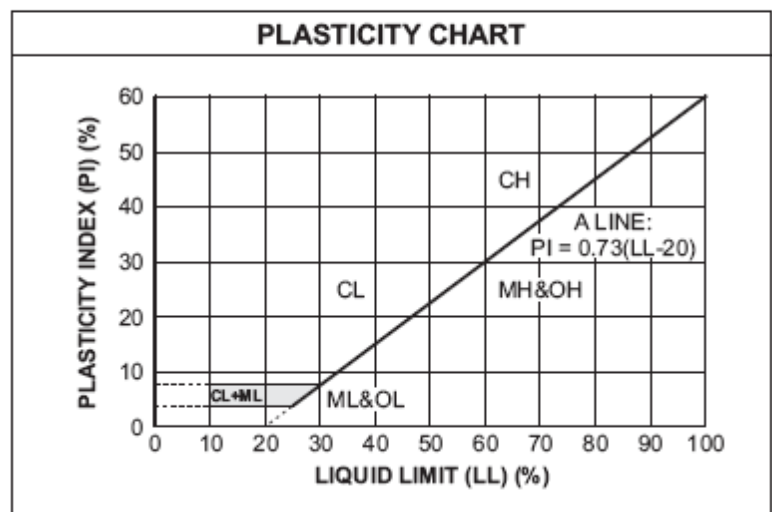
Consistency term based in relative order on Qu result, Qp result, and lastly "N" value.

RELATIVE GRAVEL PROPORTIONS			RELATIVE SIZES	
CONDITION	TERM	RANGE		
Coarse Grained Soils	trace of gravel	2-14%	Boulder	Over 12"
	with gravel	15-49%	Cobble	3" - 12"
			Gravel	
Fine Grained Soils	trace of gravel	2-14%	Coarse	3/4" - 3"
	with gravel	15-29%	Fine	#4 - 3/4"
			Sand	
30% + No. 200	trace of gravel	2-14%	Coarse	#4 - #10
30% + No. 200	with gravel	15-24%	Medium	#10 - #40
30% + No. 200	gravelly	25-49%	Fine	#40- #200
			Silt & Clay	- # 200, Based on Plasticity

Unified Soil Classification System (USCS)

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART			
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)		
		SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA		
GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	
<p>Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:</p> <p>Less than 5 percent GW, GP, SW, SP</p> <p>More than 12 percent GM, GC, SM, SC</p> <p>5 to 12 percent Borderline cases requiring dual symbols</p>		



Boring Logs 2011-01 through 2011-11



Gestra Engineering Inc.
7600 75th Street, Suite 206
Kenosha, WI 53142
phone: (262) 925-1885; fax (262) 925-1888

SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/24/2011

BORING NUMBER

2011-1

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/24/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

365000

LAB LOG / QC

E. Jeske

EASTING

459731

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

799.6 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q _u or Q _{tip}) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	18	6 1 1	2		PEAT, black, wet								LOI = 5.1% Sample SS-1 is frozen
SH - 2	16				LEAN CLAY, gray to green with yellow mottling, wet	CL			0.79			228.1 25	LOI = 21.9% γ _d = 102.4 pcf γ _T = 126.8 pcf
SS - 3	18	5 6 8	14	5	794.6	fine to coarse SAND, with silt, brown, wet, medium dense	SP-SM						Gravel = 4.6% Sand = 80.5% P200 = 14.9%
SS - 4	18	4 6 7	13		SILT, gray, wet	ML						14.9	
					SILTY CLAY, gray, wet, stiff	CL-ML							
SS - 5	18	2 3 4	7	10	789.6	LEAN CLAY, gray, wet, medium stiff to stiff	CL		0.75-1.50			20.7	
SS - 6	18	1 2 3	5	15	784.6	SILTY CLAY, with sand and silt lamination, gray, wet, medium stiff to stiff	CL-ML		0.75-1.00			18.7	
					End of Boring at 15.0'								
				20	779.6								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 0	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 3	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/23/2011

BORING NUMBER

2011-2

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/23/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

364675

LAB LOG / QC

E. Jeske

EASTING

460023

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

800.2 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q _u or Q _p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	12	2 2 2	4		ORGANIC CLAY, with vegetation, black, moist to very moist, very soft	OH			0.00			48.7	LOI = 9.2%
SH - 2	9				LEAN CLAY, gray to green with yellow mottling, wet	CL			0.85			36.7	γ _d = 91.1 pcf γ _T = 124.5 pcf LOI = 2.1%
SS - 3	14	2 2 2	4	5	SANDY SILT, fine grained sand, brown and gray mottled, wet, loose	ML						19.8	
SS - 4	18	1 2 3	5	10	LEAN CLAY, with thin sand seams and lamination, brownish gray, wet, stiff to very stiff				1.00-1.25			22.7	
SS - 5	15	3 5 6	11			CL			2.25-3.00			26.3	
SS - 6	16	5 7 11	18	15	fine to coarse SAND, little gravel, brown, wet, medium dense	SP							
					End of Boring at 15.0'								
				20	780.2								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 5	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 2	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

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SOIL BORING LOG

PAGE NUMBER	1 of 1
BORING NUMBER	2011-3
PROJECT NUMBER	10031-10
DRILLING RIG	Diedrich D50
DRILLING METHOD	3 1/4" HSA
SURFACE ELEVATION	799.9 ft

PROJECT NAME	Waukesha By-Pass	DATE DRILLING STARTED	2/23/2011
PROJECT LOCATION	Waukesha, WI	DATE DRILLING ENDED	2/23/2011

BORING DRILLED BY	FIELD LOG	NORTHING	DRILLING METHOD
FIRM: Gestra	B. Sargent	364459	3 1/4" HSA
CREW CHIEF: A. Woerpel	LAB LOG / QC	E. Jeske	460288
			SURFACE ELEVATION

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation -	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q _u or Q _p) (tsf)	Liquid Limit	Plasticity Index -	Moisture Content (%) -	Comments
SS - 1	9	1 1 2	3		ORGANIC CLAY, with vegetation, black, moist to very moist (TOPSOIL)								LOI = 2.9%
					LEAN CLAY, with peaty layers, olive gray, moist, medium stiff	CL			0.50-0.75			32	
SH - 2	20 1/2			794.9	LEAN CLAY, with silty and sand pockets, blueish gray with brown mottling, moist, soft to medium stiff	CL			0.25-0.75 0.47			18.4	$\gamma_d = 114.5$ pcf $\gamma_T = 135.8$ pcf
SS - 3	15	3 3 5	8	794.9	SILTY fine to medium SAND, brownish gray with rust color mottling, wet, loose	SM						19.3	Gravel = 0.0% Sand = 40.3% P200 = 59.7%
SS - 4	18	4 5 7	12	789.9	LEAN CLAY, brownish gray and gray, wet, very stiff	CL						26.2	
SS - 5	18	7 5 12	17		fine to coarse SAND, with silt and silt layers, little gravel, brown and gray, wet, medium dense	SP-SM							
SS - 6	18	6 7 11	18	784.9									No sample retained
				15	End of Boring at 15.0'								
				20	779.9								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 7.5	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 2.5	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/24/2011

BORING NUMBER

2011-4

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/24/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

364145

LAB LOG / QC

E. Jeske

EASTING

460720

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

797.4 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation -	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q _u or Q _s) (tsf)	Liquid Limit	Plasticity Index -	Moisture Content (%) -	Comments
SS - 1	15	1 2 2	4		ORGANIC CLAY, with vegetation, black, wet (TOPSOIL)							31.3	
SH - 2	17				LEAN CLAY, with sand, olive gray, very moist, medium stiff to stiff				0.5-0.75			28.6	
					Color change to blueish gray at 2.0'								
					5" thick pocket of medium to coarse grained sand at 2.5'								
SS - 3	18	2 3 3	6	5	792.4	CL			1.50			26.7	
					Color change to gray in sample SS-3								
SS - 4	16	3 6 2	8		ALTERNATING CLAY and SAND layers, gray, wet	CL/ SC						23.1	
					fine to coarse SAND, with gravel, brown, wet, medium dense								
SS - 5	18	6 4 7	11	10	787.4	SP							
SS - 6	18	5 5 7	12	15	782.4								
					End of Boring at 15.0'								
				20	777.4								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 0	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 2	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/24/2011

BORING NUMBER

2011-5

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/24/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

363763

LAB LOG / QC

E. Jeske

EASTING

461106

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

798.3 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	7	1 1 3	4		ORGANIC CLAY, with sand and vegetation, black, moist, stiff	OL			1.00			55.4	LOI = 12.2%
SH - 2	19 1/2				LEAN CLAY, interbedded layers of fine to medium grained gravel, gray, moist	CL			0.5-1.0 1.04			19.9	$\gamma_d = 111.9$ pcf $\gamma_T = 134.2$ pcf
					LEAN CLAY, gray to reddish brown/ rusty brown, moist, medium stiff to stiff	CL							
SS - 3	18	4 4 5	9	5 793.3	LEAN CLAY, gray, moist, stiff to very stiff	CL			1.75-2.50			24.7	
SS - 4	18	4 2 6	8	10 788.3	SILT, with clay seams, brown, moist, loose	ML						22.2	
SS - 5	18	3 4 7	11		SILTY fine to coarse SAND, with gravel and clay seam in sample SS-5, brown, wet, medium dense	SM							
SS - 6	18	4 7 9	16	15 783.3	LEAN CLAY, with sand, gray, wet, stiff	CL			1.00			19.6	
					End of Boring at 15.0'								
				20 778.3									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 10	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 7	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/25/2011

BORING NUMBER

2011-6

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/25/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

362882

LAB LOG / QC

E. Jeske

EASTING

461567

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

812 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q _u or Q _p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	5	2 1 1	2		PEAT, black, wet								LOI = 68%
SH - 2	18				With layers of blueish gray clay below 2.0'							432.2	Clay portion of the sample is disturbed unable to get Qp value LOI = 55.1% LOI = 4%
					LEAN CLAY, blueish gray, moist	CL						63.8	
SS - 3	18	11 8 13	21	5 807.0	fine to coarse SAND, with silt and gravel, brown, wet, medium dense								Gravel = 31.4% Sand = 57.7% P200 = 10.9%
SS - 4	13	2 2 6	8		LEAN CLAY, with sand, brown, moist, medium stiff to stiff				0.75-1.00			19.2	
SS - 5	6	3 3 7	10	10 802.0	SANDY CLAY, fine to coarse grained sand, with gravel, brown, wet, medium dense to dense							20.7	
SS - 6	9	10 20 23	43									8.3	
				15 797.0	End of Boring at 15.0'								
				20 792.0									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 0	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 6	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



Gestra Engineering Inc.
7600 75th Street, Suite 206
Kenosha, WI 53142
phone: (262) 925-1885; fax (262) 925-1888

SOIL BORING LOG

PAGE NUMBER

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PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/24/2011

BORING NUMBER

2011-7

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/24/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

362422

LAB LOG / QC

E. Jeske

EASTING

461880

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

800.6 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q _u or Q _p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	4	2 1 1	2		PEAT, black, wet (TOPSOIL)								LOI = 19.4%
SH - 2	16				LEAN CLAY, blueish gray, wet, stiff 3"-4" sand and gravel layer Color change to brownish gray at 3.0'	CL			1.25			150.2	
SS - 3	18	2 4 4	8	5	SILT, with clayey layers, brown, moist, loose	ML						21.7	
SS - 4	18	2 3 6	9	10	SANDY SILT, 1/2" thick clay layer in SS-4, fine to medium grained sand, brown, very moist, loose	ML						18.1	
SS - 5	12	12 8 10	18		fine to coarse SAND, with gravel (large fractured gravel pieces in sample SS-5) and silt, brown, wet, medium dense	SP-SM						31.1	
SS - 6	18	4 3 7	10	15	fine to medium SAND, brown, wet, medium dense	SP							
				20	End of Boring at 15.0'								
				780.6									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 0	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 2	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/23/2011

BORING NUMBER

2011-8

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/23/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

364056

LAB LOG / QC

E. Jeske

EASTING

459974

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

821.9 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q _u or Q _{tip}) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	7	3 3 4	7		LEAN CLAY, trace gravel, dark brown, moist, soft to stiff	CL			0.50-1.00			22	
SH - 2	7				Color change to tan/ light brown at 2.0'				0.25			14.8	Pushed tube 12", Driller notes possible gravel layer from 3.0' to 5.0'
					GRAVEL	GP							Driller noted hard drilling at 3.0'
SS - 3	16	8 6 8	14	5 816.9	LEAN CLAY, little gravel, tan with gray mottling, moist, very stiff	CL			3.25			18	
SS - 4	6	16 26 28	54	10 811.9	With silty sand seams in sample SS-4	CL						18.5	Pushed stone while sampling
SS - 5	15	16 20 23	43		SANDY SILT, fine grained sand, with gravel, tan, wet, dense (GLACIAL TILL)	ML						9.2	
SS - 6	15	18 23 22	45	15 806.9	SANDY SILT, fine grained sand, gray, wet, dense (GLACIAL TILL)	ML						10.6	
				20 801.9	End of Boring at 15.0'								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 10	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 8	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/23/2011

BORING NUMBER

2011-9

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/23/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

363778

LAB LOG / QC

E. Jeske

EASTING

460333

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

809 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
SS - 1	15	1 1 3	4		LEAN CLAY, with organics, black/ dark brown and blueish gray, moist, medium stiff to stiff				0.75-1.00			34.8	LOI = 4.9%
SH - 2	11				2" Peat layer at 2.0'	CL			0.5-1.0 0.77			29.76361	$\gamma_d = 96.8$ pcf $\gamma_T = 125.6$ pcf
SS - 3	10	3 4 5	9	5 804.0	LEAN CLAY, with sand, gravel and roots in sample SS-3, gray, moist, stiff to very stiff				1.25			21.5	
SS - 4	18	3 7 9	16		3" thick silty sand and gravel seam	CL			2.50			20.3	
SS - 5	12	7 9 6	15	10 799.0	SILTY fine to coarse SAND and subrounded to sub fractured GRAVEL, gray with brown, wet, medium dense	SM							
SS - 6	18	5 2 4	6	15 794.0	SILTY CLAY, with silt seams, gray, wet, stiff	CL-ML			1.00			18.1	
				20 789.0	End of Boring at 15.0'								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 10	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): N/A	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/25/2011

BORING NUMBER

2011-10

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/25/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

362845

LAB LOG / QC

E. Jeske

EASTING

460814

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

849.6 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation -	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index -	Moisture Content (%) -	Comments
SS - 1	15	4 1 4	5		LEAN CLAY, brown to dark brown, moist, medium stiff to stiff				1.00			20.4	
SH - 2	8				Layers of loosely consolidated weather silt	CL			0.5-1.5			28.5	
SS - 3	17	3 3 3	6	5 844.6	SILTY fine to medium SAND, dark brown, moist, loose	SM						10.7	
SS - 4	15	2 4 4	8		fine SAND, light brown, moist, loose	SP							
SS - 5	11	4 12 20	32	10 839.6	fine to coarse SAND, with gravel and silt, brown, moist, dense	SP-SM							
SS - 6	12	18 27 20	47	15 834.6	subrounded to angular GRAVEL, with sand, brown, moist, dense	GP							
				20 829.6	End of Boring at 15.0'								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT):	CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): N/A	CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



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SOIL BORING LOG

PAGE NUMBER

1 of 1

PROJECT NAME

Waukesha By-Pass

DATE DRILLING STARTED

2/25/2011

BORING NUMBER

2011-11

PROJECT LOCATION

Waukesha, WI

DATE DRILLING ENDED

2/25/2011

PROJECT NUMBER

10031-10

DRILLING RIG

Diedrich D50

BORING DRILLED BY

FIRM: Gestra
CREW CHIEF: A. Woerpel

FIELD LOG

B. Sargent

NORTHING

362591

LAB LOG / QC

E. Jeske

EASTING

461417

DRILLING METHOD

3 1/4" HSA

SURFACE ELEVATION

823 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation -	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index -	Moisture Content (%) -	Comments
SS - 1	12	3 5 7	12		LEAN CLAY, with roots, little gravel, dark brown, moist (TOPSOIL)				1.00			22.5	Driller pushed split spoon due to encounter high gravel content from 1.5' to 2.0' Pushed stone, recovery seemed to be mostly cave-in material (lean clay, with roots, dark brown, moist)
					Increase in gravel content								
SS - 2	6	3 6 7 4	13		SANDY CLAY, fine to coarse grained sand, with gravel, brown, moist	CL						12.9	
SS - 3	4	3 6 8	14	5	818.0								
SS - 4	16	3 4 5	9		CLAYEY fine to coarse SAND, tan, wet, loose	SC						10.4	
SS - 5	16	3 3 4	7	10	813.0							9.2	
SS - 6	17	7 19 23	42	15	808.0	SP							
					fine to coarse SAND, with gravel, brown, wet, dense								
					End of Boring at 15.0'								
				20	803.0								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING (FT): 6.5		CAVE DEPTH AT COMPLETION (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AT COMPLETION (FT): 11		CAVE DEPTH AFTER HOURS (FT): N/A	WET <input type="checkbox"/> DRY <input type="checkbox"/>
WATER LEVEL AFTER (FT): N/A			

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

Attachment C
Laboratory Test Results



GESTRA Engineering, Inc

1626 W. Fond du Lac Avenue

Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

**Laboratory Test Results of
Moisture Content, Organic Content, and Density of Soil**

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2216, D 2974

Date: 3/1 & 3/25/2011
Report To: CH2M HILL

Boring Number	2011-1	2011-1	2011-1	2011-1	2011-1	2011-1		
Sample Number	1	2A	2B	4	5	6		
Cup Number	CUP 90	PC90	G2	33	30	24		
Weight of Cup (g)	47.78	47.81	14.34	15.69	15.96	16.05		
Weight of Wet Soil and Cup (g)	83.18	157.02	38.88	67.98	52.80	69.30		
Weight of Dry Soil and Cup (g)	72.07	81.10	33.97	61.18	46.49	60.91		
Weight of Soil and Cup After Burn (g)	70.83	73.82						
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	45.7	228.1	25.0	14.9	20.7	18.7		
Organic Content (%)	5.1	21.9						
Wet Density (pcf)								
Dry Density (pcf)								

Boring Number	2011-2	2011-2	2011-2	2011-2	2011-2			
Sample Number	1	2	3	4	5			
Cup Number	CUP 7	PC-7	20	130	34			
Weight of Cup (g)	59.90	59.93	15.81	15.82	15.84			
Weight of Wet Soil and Cup (g)	90.53	114.13	57.32	51.05	52.39			
Weight of Dry Soil and Cup (g)	80.50	99.59	50.47	44.54	44.78			
Weight of Soil and Cup After Burn (g)	78.61	98.76						
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	48.7	36.7	19.8	22.7	26.3			
Organic Content (%)	9.2	2.1						
Wet Density (pcf)								
Dry Density (pcf)								

Geotechnical-Structural-Pavement-Construction Material



GESTRA Engineering, Inc

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Milwaukee, WI 53205

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**Laboratory Test Results of
Moisture Content, Organic Content, and Density of Soil**

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2216, D 2974

Date: 3/1 & 3/25/2011
Report To: CH2M HILL

Boring Number	2011-3	2011-3	2011-3					
Sample Number	1	2	4					
Cup Number	CUP 52	26	15					
Weight of Cup (g)	59.06	15.76	15.59					
Weight of Wet Soil and Cup (g)	83.17	56.98	48.92					
Weight of Dry Soil and Cup (g)	77.33	50.57	42.00					
Weight of Soil and Cup After Burn (g)	76.8							
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	32.0	18.4	26.2					
Organic Content (%)	2.9							
Wet Density (pcf)								
Dry Density (pcf)								

Boring Number	2011-4	2011-4	2011-4	2011-4				
Sample Number	1	2	3	4				
Cup Number	18	30	17	26				
Weight of Cup (g)	15.74	15.91	15.82	15.79				
Weight of Wet Soil and Cup (g)	48.42	41.93	49.19	67.73				
Weight of Dry Soil and Cup (g)	40.63	36.14	42.15	57.98				
Weight of Soil and Cup After Burn (g)								
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	31.3	28.6	26.7	23.1				
Organic Content (%)								
Wet Density (pcf)								
Dry Density (pcf)								

Geotechnical-Structural-Pavement-Construction Material



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**Laboratory Test Results of
Moisture Content, Organic Content, and Density of Soil**

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2216, D 2974

Date: 3/1 & 3/25/2011
Report To: CH2M HILL

Boring Number	2011-5	2011-5	2011-5	2011-5	2011-5			
Sample Number	1	2	3	4	6			
Cup Number	CUP 6	321	S-17	S-4	35			
Weight of Cup (g)	35.87	16.88	16.76	15.70	17.03			
Weight of Wet Soil and Cup (g)	61.45	68.21	51.65	53.35	63.87			
Weight of Dry Soil and Cup (g)	52.33	59.68	44.74	46.52	56.18			
Weight of Soil and Cup After Burn (g)	50.33							
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	55.4	19.9	24.7	22.2	19.6			
Organic Content (%)	12.2							
Wet Density (pcf)								
Dry Density (pcf)								

Boring Number	2011-6	2011-6	2011-6	2011-6	2011-6	2011-6		
Sample Number	1	2A	2B	4	5	6		
Cup Number	CUP 5	PC-3	PC-1	113	S-23	13		
Weight of Cup (g)	34.99	25.96	20.25	16.80	16.73	15.77		
Weight of Wet Soil and Cup (g)	57.13	44.90	47.13	50.49	42.84	74.04		
Weight of Dry Soil and Cup (g)	39.15	29.72	36.66	45.06	38.37	69.58		
Weight of Soil and Cup After Burn (g)	36.32	27.65	36.01					
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	432.2	403.7	63.8	19.2	20.7	8.3		
Organic Content (%)	68.0	55.1	4.0					
Wet Density (pcf)								
Dry Density (pcf)								

Geotechnical-Structural-Pavement-Construction Material



GESTRA Engineering, Inc

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Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

**Laboratory Test Results of
Moisture Content, Organic Content, and Density of Soil**

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2216, D 2974

Date: 3/1 & 3/25/2011
Report To: CH2M HILL

Boring Number	2011-7	2011-7	2011-7	2011-7				
Sample Number	1	2	3	4				
Cup Number	CUP 14	25	S-22	S-10				
Weight of Cup (g)	22.38	15.81	16.72	16.94				
Weight of Wet Soil and Cup (g)	44.65	51.38	73.24	70.25				
Weight of Dry Soil and Cup (g)	31.28	45.03	64.58	57.59				
Weight of Soil and Cup After Burn (g)	29.55							
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	150.2	21.7	18.1	31.1				
Organic Content (%)	19.4							
Wet Density (pcf)								
Dry Density (pcf)								

Boring Number	2011-8	2011-8	2011-8	2011-8	2011-8	2011-8		
Sample Number	1	2	3	4	5	6		
Cup Number	S-12	33	1	A-26	F1	S-16		
Weight of Cup (g)	16.82	15.66	15.79	15.92	12.72	16.36		
Weight of Wet Soil and Cup (g)	44.80	50.64	49.98	91.77	84.06	52.96		
Weight of Dry Soil and Cup (g)	39.75	46.13	44.76	79.93	78.06	49.44		
Weight of Soil and Cup After Burn (g)								
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	22.0	14.8	18.0	18.5	9.2	10.6		
Organic Content (%)								
Wet Density (pcf)								
Dry Density (pcf)								

Geotechnical-Structural-Pavement-Construction Material



GESTRA Engineering, Inc

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Milwaukee, WI 53205

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**Laboratory Test Results of
Moisture Content, Organic Content, and Density of Soil**

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2216, D 2974

Date: 3/1 & 3/25/2011
Report To: CH2M HILL

Boring Number	2011-9	2011-9	2011-9	2011-9	2011-9			
Sample Number	1	2	3	4	6			
Cup Number	CUP A	29	S-1	B-11	B-2			
Weight of Cup (g)	20.26	15.84	16.62	14.50	14.32			
Weight of Wet Soil and Cup (g)	57.55	52.07	46.72	58.01	54.60			
Weight of Dry Soil and Cup (g)	47.92	43.76	41.39	50.66	48.44			
Weight of Soil and Cup After Burn (g)	46.56							
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	34.8	29.8	21.5	20.3	18.1			
Organic Content (%)	4.9							
Wet Density (pcf)								
Dry Density (pcf)								

Boring Number	2011-10	2011-10	2011-10					
Sample Number	1	2	3					
Cup Number	B9	22	S-19					
Weight of Cup (g)	14.10	15.83	16.01					
Weight of Wet Soil and Cup (g)	51.05	45.12	43.55					
Weight of Dry Soil and Cup (g)	44.78	38.63	40.88					
Weight of Soil and Cup After Burn (g)								
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	20.4	28.5	10.7					
Organic Content (%)								
Wet Density (pcf)								
Dry Density (pcf)								

Geotechnical-Structural-Pavement-Construction Material



GESTRA Engineering, Inc

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Milwaukee, WI 53205

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**Laboratory Test Results of
Moisture Content, Organic Content, and Density of Soil**

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2216, D 2974

Date: 3/1 & 3/25/2011
Report To: CH2M HILL

Boring Number	2011-11	2011-11	2011-11	2011-11				
Sample Number	1	2	4	5				
Cup Number	27	23	S-13	B6				
Weight of Cup (g)	15.62	15.93	16.54	14.05				
Weight of Wet Soil and Cup (g)	52.56	66.00	73.41	78.55				
Weight of Dry Soil and Cup (g)	45.78	60.29	68.07	73.09				
Weight of Soil and Cup After Burn (g)								
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)	22.5	12.9	10.4	9.2				
Organic Content (%)								
Wet Density (pcf)								
Dry Density (pcf)								

Boring Number								
Sample Number								
Cup Number								
Weight of Cup (g)								
Weight of Wet Soil and Cup (g)								
Weight of Dry Soil and Cup (g)								
Weight of Soil and Cup After Burn (g)								
Weight of Sample for Density (lbs)								
Diameter (in)								
Length(in)								
Moisture Content (%)								
Organic Content (%)								
Wet Density (pcf)								
Dry Density (pcf)								

Geotechnical-Structural-Pavement-Construction Material



Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2166

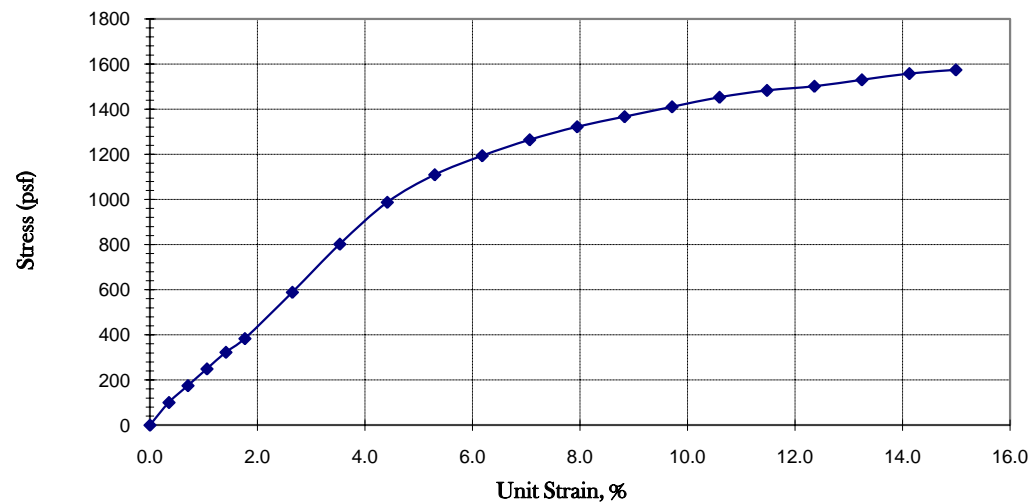
Date: March 25, 2011
Report To: CH2MHill

Test Data

Deformation dial reading (0.001 in.)	Sample stress (psf)
0	0
20	100
40	175
60	249
80	323
100	384
150	589
200	802
250	988
300	1110
350	1194
400	1265
450	1322
500	1367
550	1411
600	1453
650	1483
700	1502
750	1530
800	1558
849	1575

Sample Information

Boring no.: 2011-1 Diameter (in) 2.81
Sample no.: 2 Area (sq. in.): 6.19
Depth of Soil: 2-4' Height: (in.): 5.66
Description of Soil: LEAN CLAY, gray to green with yellow mottling, wet
Strain Rate (in/min): 0.042



Remarks

UC Strength, Q_u (tsf) 0.79
Wet Density (pcf) 126.8
Dry Density (pcf) 102.4
Moisture Content (%) 23.8

Performed By: JB

Reviewed By: E. Jeske
GESTRA Engineering, Inc.



Laboratory Test Results of Unconfined Compressive Strength of Soil

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Project Location: Waukesha, WI
ASTM Designation: D2166

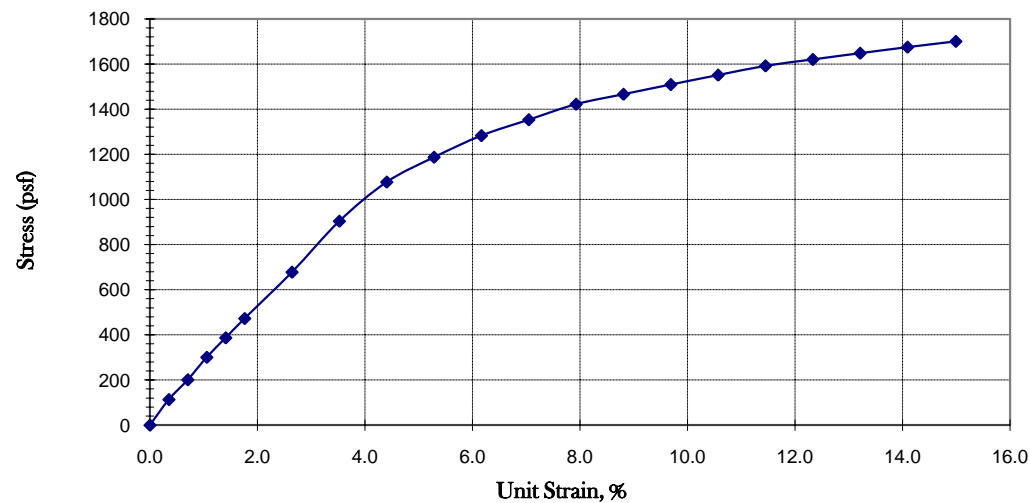
Date: March 25, 2011
Report To: CH2MHill

Test Data

Deformation dial reading (0.001 in.)	Sample stress (psf)
0	0
20	114
40	201
60	301
80	387
100	473
150	678
200	904
250	1077
300	1187
350	1283
400	1353
450	1422
500	1466
550	1509
600	1551
650	1592
700	1620
750	1648
800	1675
851	1700

Sample Information

Boring no.: 2011-2 Diameter (in) 2.80
Sample no.: 2 Area (sq. in.): 6.16
Depth of Soil: 2-4' Height: (in.): 5.68
Description of Soil: LEAN CLAY, gray to green with yellow mottling, wet
Strain Rate (in/min): 0.042



UC Strength, Q_u (tsf) 0.85
Wet Density (pcf) 124.5
Dry Density (pcf) 91.1
Moisture Content (%) 36.7

Remarks

Performed By: JB

Reviewed By: E. Jeske
GESTRA Engineering, Inc.



Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass
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Project Location: Waukesha, WI
ASTM Designation: D2166

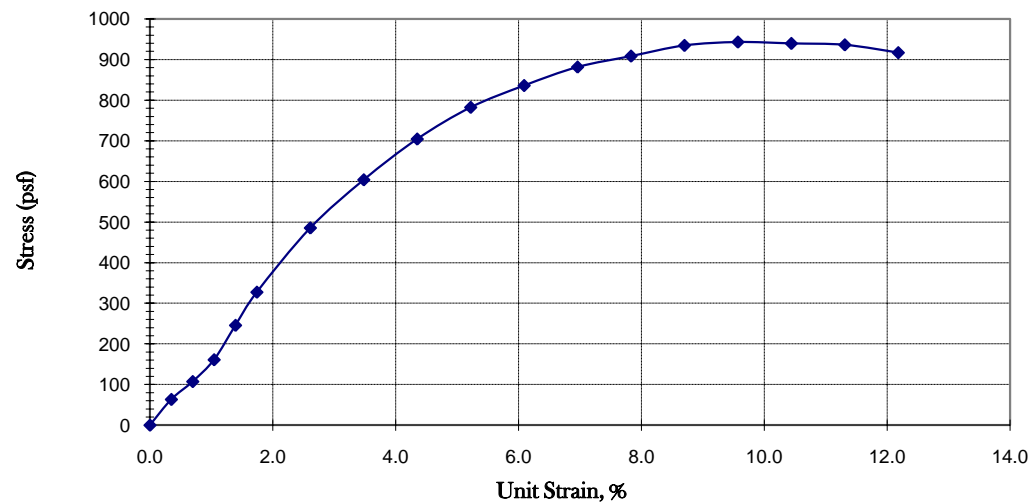
Date: March 28, 2011
Report To: CH2M HILL

Test Data

Deformation dial reading (0.001 in.)	Sample stress (psf)
0	0
20	63
40	107
60	161
80	246
100	327
150	486
200	604
250	704
300	782
350	836
400	882
450	908
500	935
550	943
600	940
650	936
700	917

Sample Information

Boring no.: 2011-3 Diameter (in) 2.79
Sample no.: 2 Area (sq. in.): 6.13
Depth of Soil: 2'-4' Height (in.): 5.75
Description of Soil: LEAN CLAY, with silt and sand pockets, blueish gray with brown mottling, moist
Strain Rate (in/min): 0.042



UC Strength, Q_u (tsf)	0.47
Wet Density (pcf)	135.8
Dry Density (pcf)	114.5
Moisture Content (%)	18.6

Remarks Sample displayed one significant vertical shear fracture. $Q_p = 0.25 - 0.75$

Performed By: SF

Reviewed By: E. Jeske
GESTRA Engineering, Inc.



Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2166

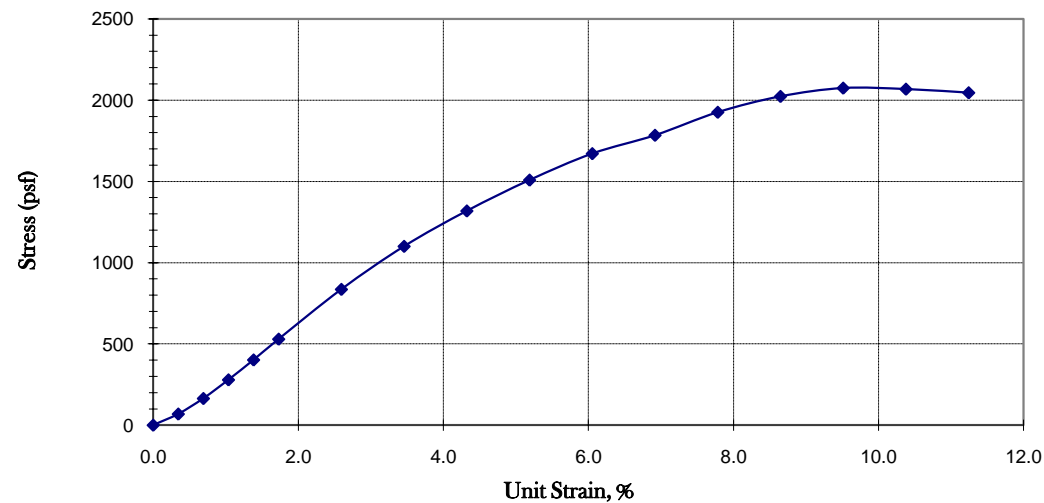
Date: April 1, 2011
Report To: CH2M HILL

Test Data

Deformation dial reading (0.001 in.)	Sample stress (psf)
0	0
20	69
40	164
60	279
80	402
100	529
150	836
200	1101
250	1319
300	1509
350	1671
400	1784
450	1926
500	2024
550	2075
600	2068
650	2046

Sample Information

Boring no.: 2011-5 Diameter (in): 2.82
Sample no.: 2 Area (sq. in.): 6.22
Depth of Soil: 2'-4' Height (in.): 5.78
Description of Soil: LEAN CLAY, gray to reddish brown/ rusty brown, moist
Strain Rate (in/min): 0.042



UC Strength, Q_u (tsf) 1.04
Wet Density (pcf) 134.2
Dry Density (pcf) 111.9
Moisture Content (%) 19.9

Remarks Sample displayed one significant "v" shaped fracture. $Q_p = 0.5 - 1.0$

Performed By: SF

Reviewed By: E. Jeske
GESTRA Engineering, Inc.



GESTRA Engineering, Inc
1626 W. Fond Du Lac Ave.
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Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass
Project Number: 10031-10
Project Location: Waukesha, WI
ASTM Designation: D2166

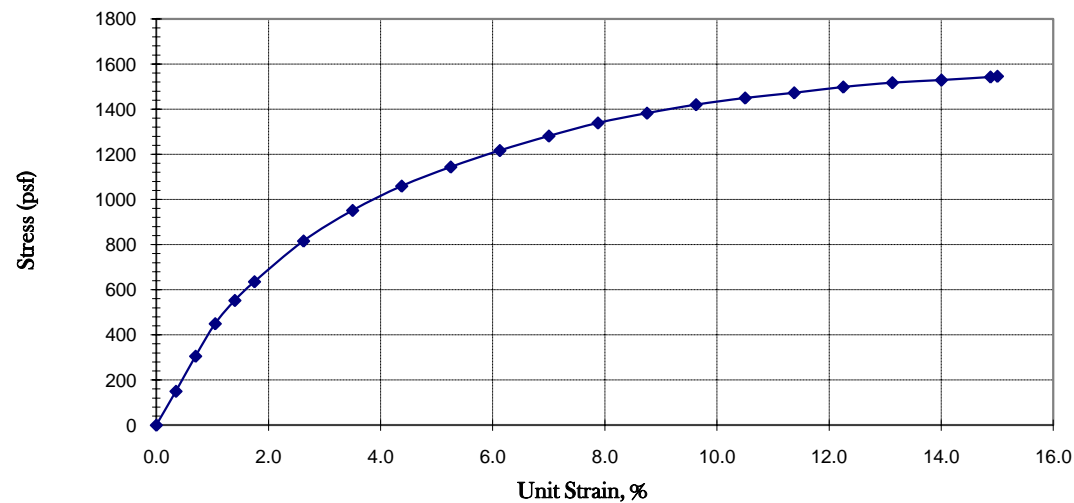
Date: April 4, 2011
Report To: CH2M HILL

Test Data

Deformation dial reading (0.001 in.)	Sample stress (psf)
0	0
20	150
40	305
60	449
80	552
100	635
150	816
200	951
250	1059
300	1144
350	1217
400	1281
450	1339
500	1382
550	1420
600	1449
650	1472
700	1498
750	1517
800	1529
850	1542

Sample Information

Boring no.: 2011-9 Diameter (in) 2.75
Sample no.: 2 Area (sq. in.): 5.96
Depth of Soil: 2'-4' Height: (in.): 5.71
Description of Soil: LEAN CLAY, dark brown and blueish gray, moist
Strain Rate (in/min): 0.042



UC Strength, Q_u (tsf) 0.77
Wet Density (pcf) 125.6
Dry Density (pcf) 96.8
Moisture Content (%) 29.8

Remarks Sample displayed minimal signs of shear stress. $Q_p = 0.5 - 1.0$

Performed By: SF

Reviewed By: E. Jeske
GESTRA Engineering, Inc.



GESTRA Engineering, Inc

1626 W. Fond du Lac Avenue

Milwaukee, WI 53205

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Laboratory Test Results of Mechanical Analysis of Soil or Aggregate

Project Name: Waukesha By-Pass
Project Number: 10031-10
Project Location: Waukesha Co., WI
ASTM Designation: C136, D422

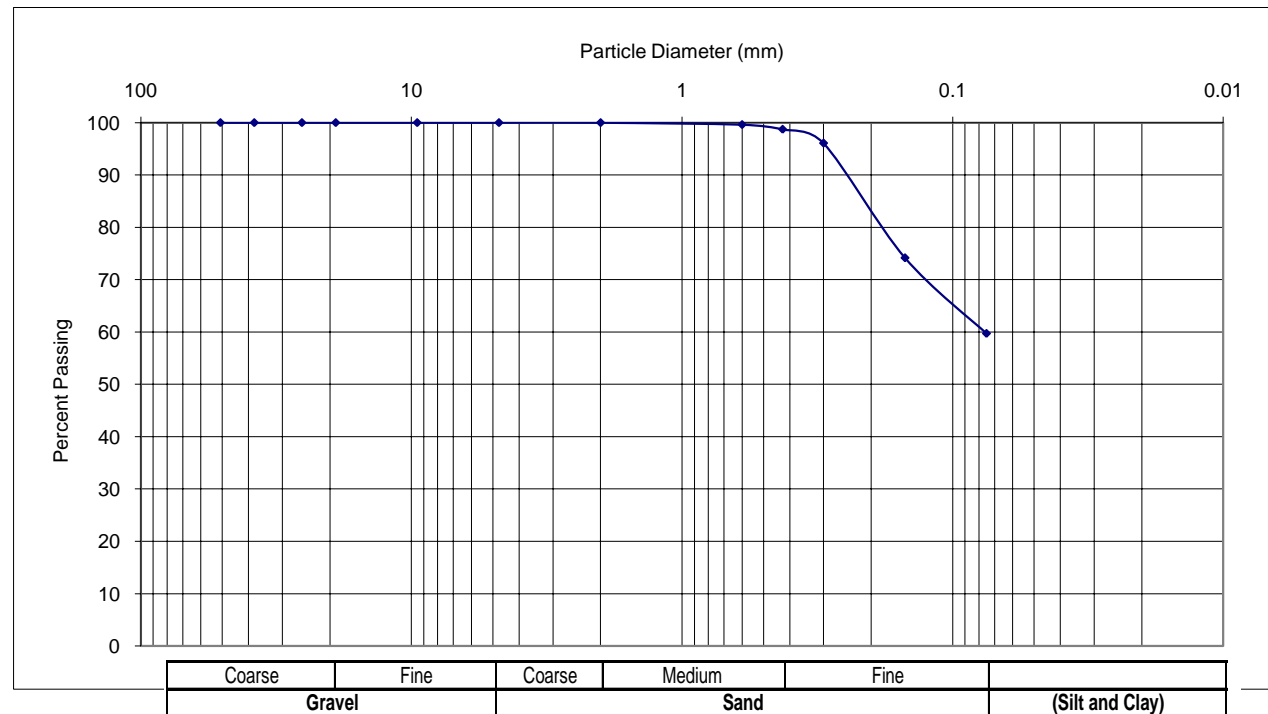
Date: April 18, 2011
Reported To: CH2M Hill

Sample Information

Type of Sample: Split Spoon Sample Number: 3
Boring Number: 2011-3 Depth of Sample: 6'-7.5'

Mechanical Analysis Data

Sieve	Sieve Opening (mm)	Percent Passing (%)
2 in.	50.8	100
1 1/2 in.	38.1	100
1 in.	25.4	100
3/4 in.	19.05	100
3/8 in.	9.525	100
#4	4.75	100
#10	2	100
#30	0.6	100
#40	0.425	98.7
#50	0.3	96.1
#100	0.15	74.2
#200	0.075	59.7



Moisture Content 19.3 %

Remarks: Gravel 0.0 % Sand 40.3 %
Passing #200 Sieve (Silt & Clay) 59.7 %

Performed by: ESJ

Reviewed by: E. Jeske
GESTRA Engineering, Inc.



GESTRA Engineering, Inc

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Milwaukee, WI 53205

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Laboratory Test Results of Mechanical Analysis of Soil or Aggregate

Project Name: Waukesha By-Pass
Project Number: 10031-10
Project Location: Waukesha Co., WI
ASTM Designation: C136, D422

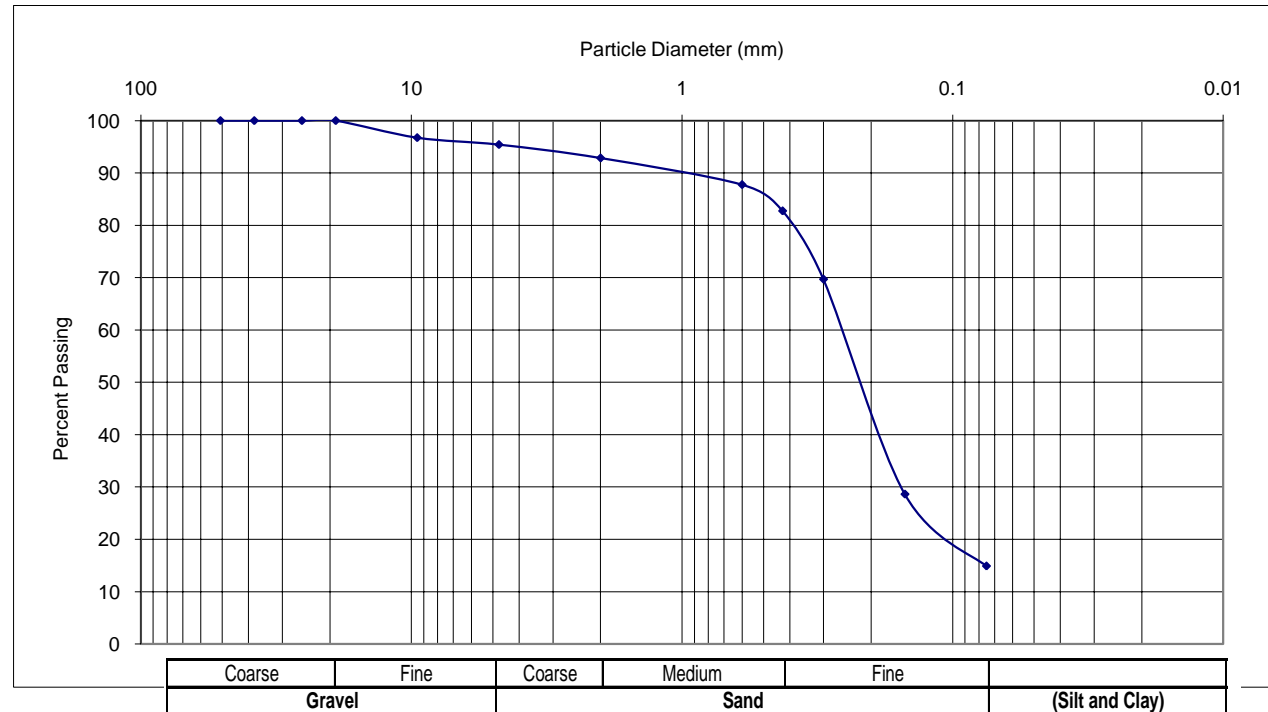
Date: April 18, 2011
Reported To: CH2M Hill

Sample Information

Type of Sample: Split Spoon Sample Number: 3
Boring Number: 2011-1 Depth of Sample: 6'-7.5'

Mechanical Analysis Data

Sieve	Sieve Opening (mm)	Percent Passing (%)
2 in.	50.8	100
1 1/2 in.	38.1	100
1 in.	25.4	100
3/4 in.	19.05	100
3/8 in.	9.525	96.7
#4	4.75	95.4
#10	2	92.9
#30	0.6	87.8
#40	0.425	82.8
#50	0.3	69.7
#100	0.15	28.6
#200	0.075	14.9



Remarks: Gravel 4.6 % Sand 80.5 %
Passing #200 Sieve (Silt & Clay) 14.9 %

Performed by: ESJ

Reviewed by: E. Jeske
GESTRA Engineering, Inc.



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Milwaukee, WI 53205

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Laboratory Test Results of Mechanical Analysis of Soil or Aggregate

Project Name: Waukesha By-Pass
Project Number: 10031-10
Project Location: Waukesha Co., WI
ASTM Designation: C136, D422

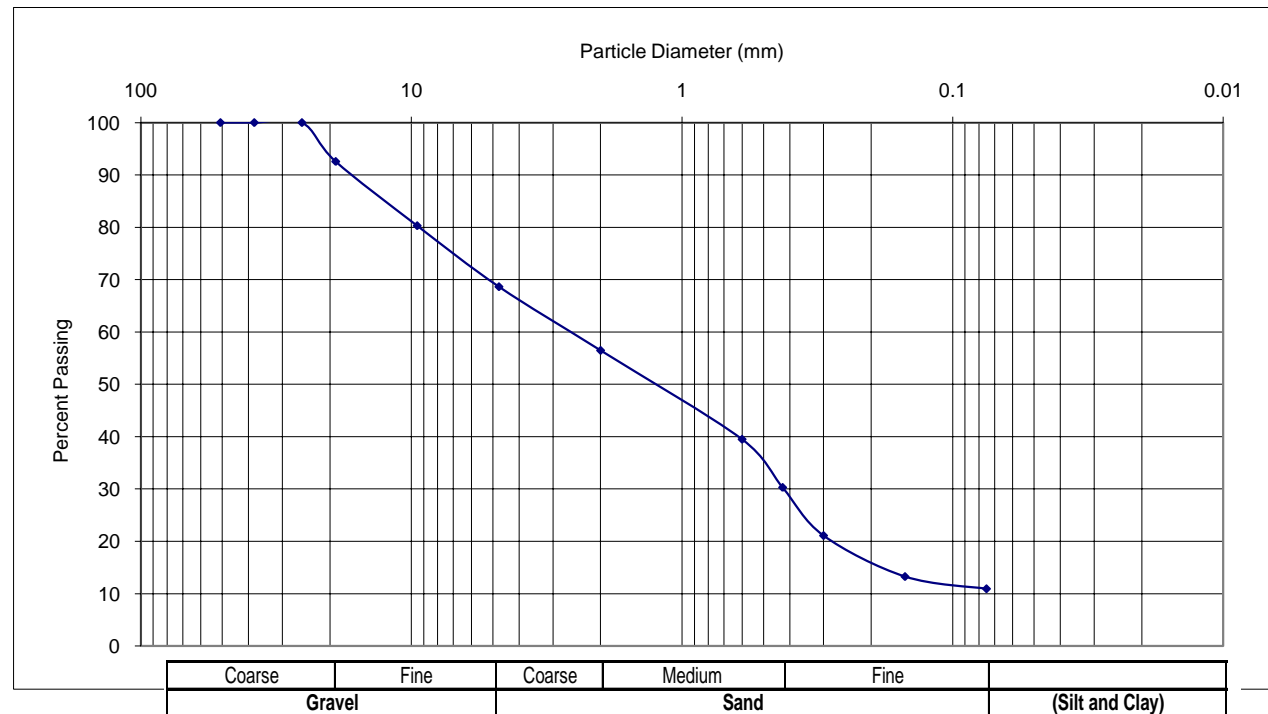
Date: April 18, 2011
Reported To: CH2M Hill

Sample Information

Type of Sample: Split Spoon Sample Number: 3
Boring Number: 2011-6 Depth of Sample: 6'-7.5'

Mechanical Analysis Data

Sieve	Sieve Opening (mm)	Percent Passing (%)
2 in.	50.8	100
1 1/2 in.	38.1	100
1 in.	25.4	100
3/4 in.	19.05	93
3/8 in.	9.525	80.3
#4	4.75	68.6
#10	2	56.5
#30	0.6	39.5
#40	0.425	30.3
#50	0.3	21.1
#100	0.15	13.3
#200	0.075	10.9



Remarks: Gravel 31.4 % Sand 57.7 %
Passing #200 Sieve (Silt & Clay) 10.9 %

Performed by: ESJ

Reviewed by: E. Jeske
GESTRA Engineering, Inc.